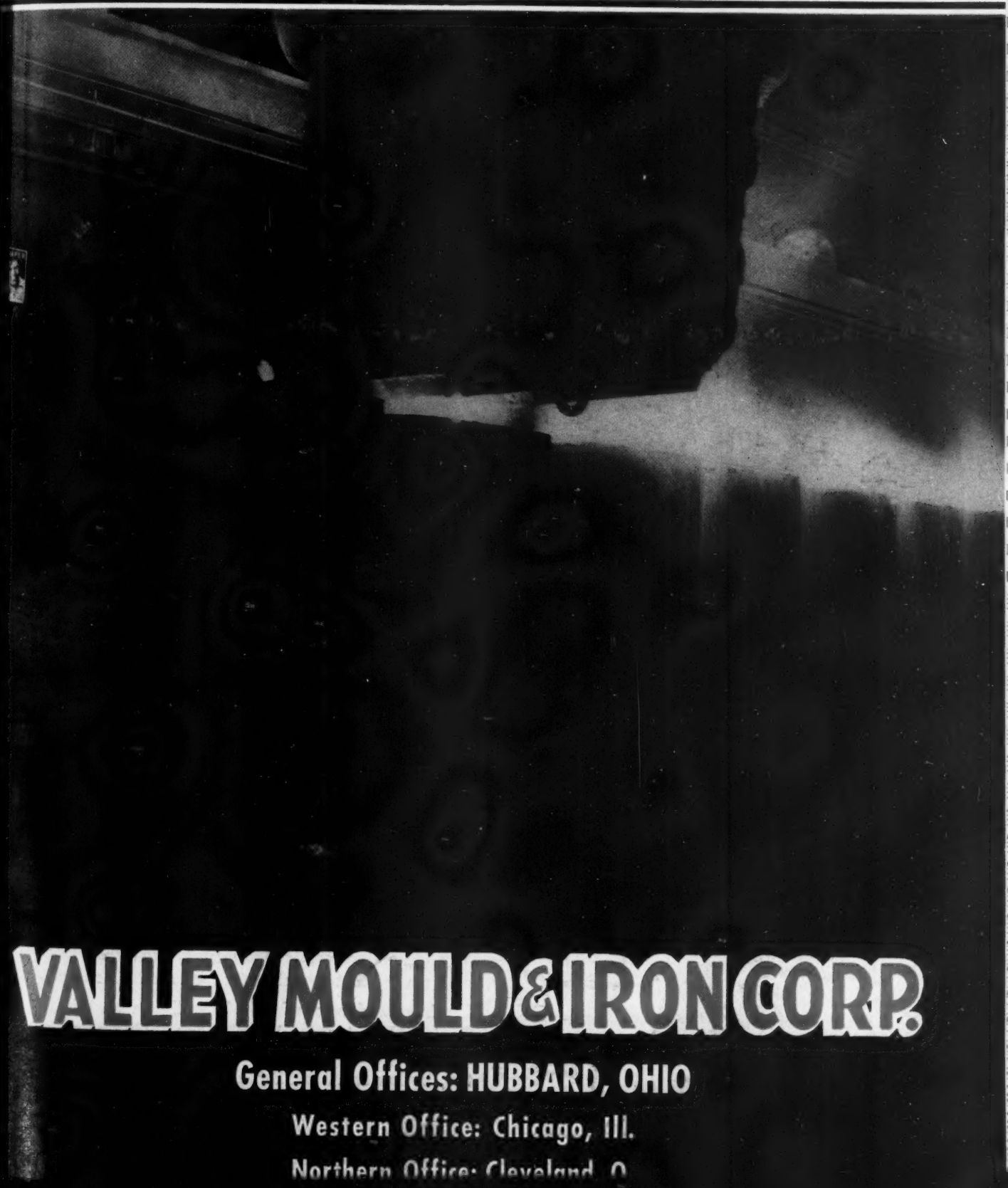
February 2, 1948

STEEL

The Magazine of Metalworking and Metalproducing

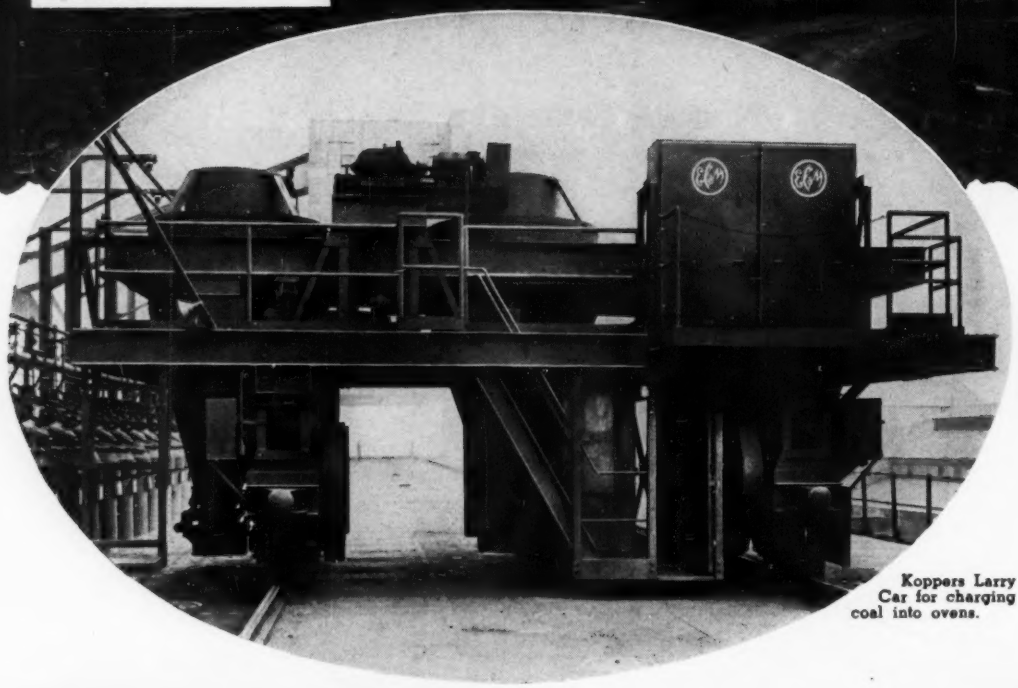
ESTABLISHED 1882

EDITORIAL INDEX, PAGE 61



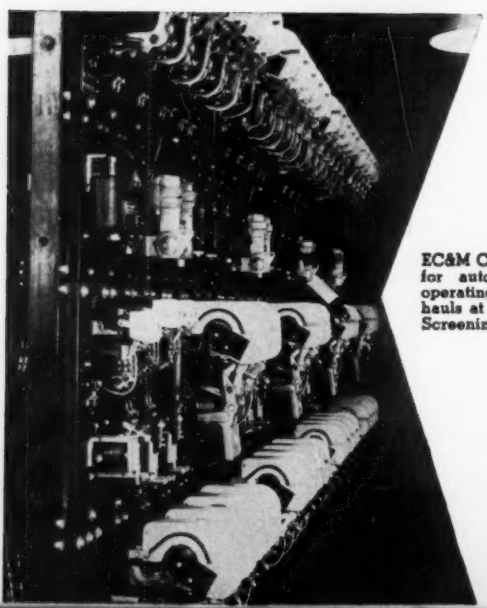
EC&M Control Improves Operation of Coke Oven Machines

Coke Pusher built by Wellman Engineering Company, for the Wilputte Coke Oven Division. Door-Machine is in left foreground.



Koppers Larry Car for charging coal into ovens.

Here's How



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STEEL

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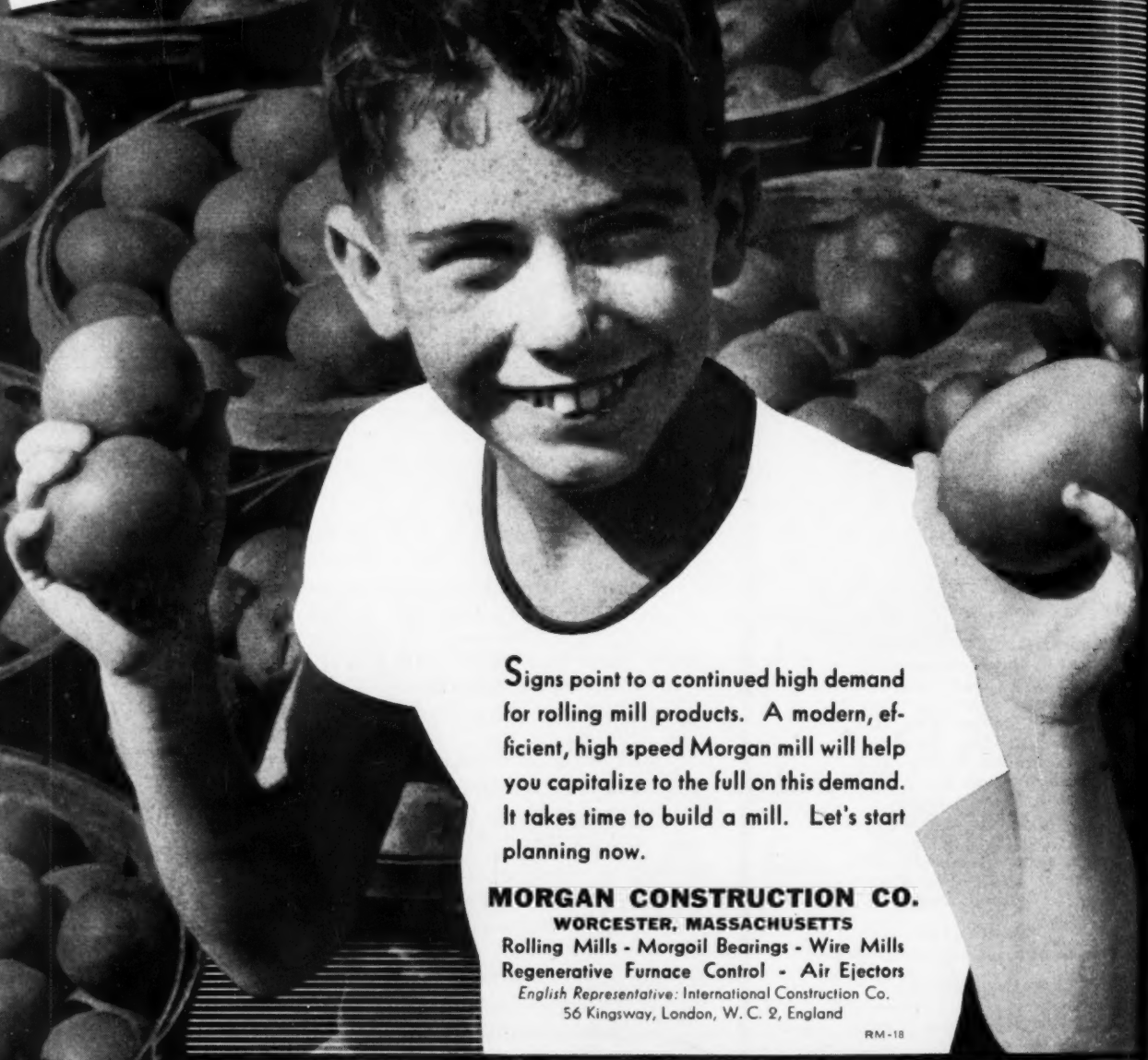
are you ready for the harvest?



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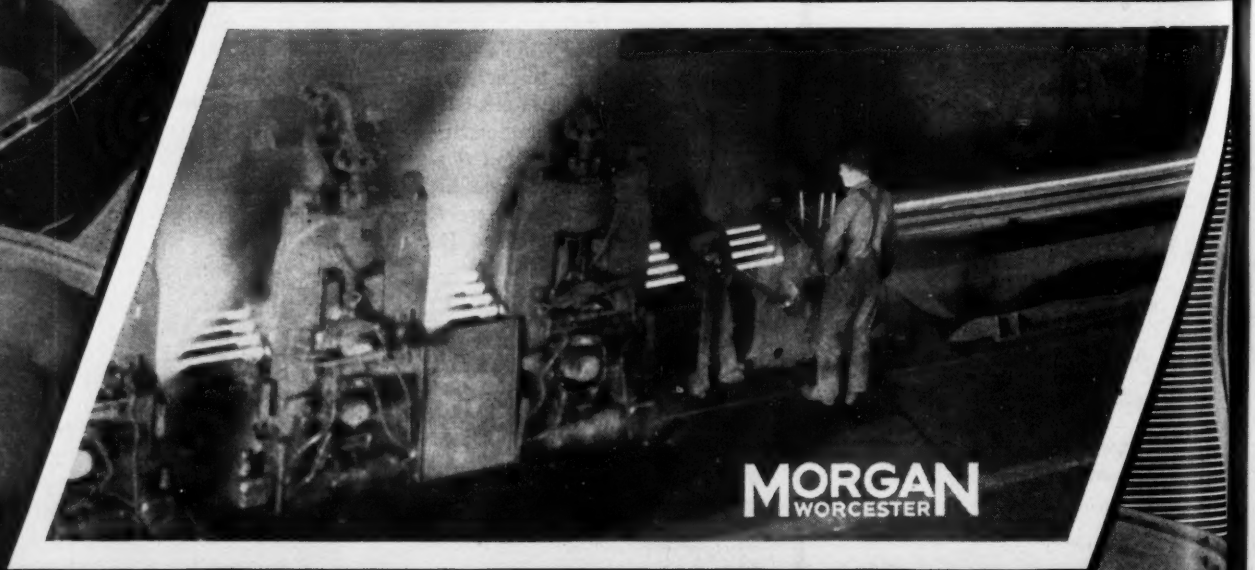

February 2, 1948

Oil and Steel

During recent weeks, severe weather has accented the shortage of fuel oil in certain districts of the United States. This immediate crisis has drawn attention to the tight situation in petroleum products on a national and international scale that has been developing for months. The result is that today some of the discussions in Washington regarding remedies for the oil situation are becoming panicky.

As in the case of every other commodity which is in short supply, more oil cannot be produced immediately by new laws, directives from Washington or proposals to build new capacity. To be effective in the short-term period, relief must come from better utilization of existing producing and distributing facilities. In the present instance this involves, among other things, a shifting of some refinery activity from gasoline to fuel oil. To do this effectively requires some co-ordination and co-operation between competing oil companies.

Recalling the double-crossing treatment accorded the oil companies at Madison some years ago because they co-operated at the urgent request of then Secretary of Interior Ickes, oil company executives in the present emergency were reluctant to enter into any co-operative scheme without a clear-cut promise of immunity against anti-trust action by the Department of Justice. Attorney General Clark gave that promise last Wednesday. Now the mix of petroleum products can be geared more closely to immediate demands.

However, this shift to meet the present crisis will endanger gasoline supplies next summer. More crude will be needed for more of many petroleum products. This means that for several years at least the petroleum industry will require more steel for oil country goods, pipe lines, refinery equipment and accessories than it has been receiving. Should it become necessary to speed the development of facilities for producing synthetic oil, as proposed by Secretary Krug, then the demand for steel will soar to fantastic heights.

Oil is a tremendously important commodity in today's troubled world. The long-range oil problem is closely geared to the supply of steel. It would seem desirable for the leaders in oil and steel to get the most competent opinion about future needs that is obtainable and to begin now to do whatever is necessary to meet the situation.

* * *

GIVE THEM THE FACTS: A few months ago Opinion Research Corp. surveyed the attitude of industrial employees toward the Taft-Hartley Act. To the question as to whether Congress should have passed this law, more than one of every two employees answered "no." Employees also were asked about eight specific provisions in the act. About three-quarters of the employees favored these eight provisions.

The obvious explanation of this paradox is that the terrific propaganda against the Taft-Hartley Act has been effective enough to cause a majority of employees to condemn it in toto, yet the reaction of individuals to specific objectives of the act is favorable.

A similar contradiction may be manifested in regard to the profits for 1947 now being announced by industrial corporations. Union propaganda already is trying to capitalize on industry's "exorbitant" profits by using them as an argument for sharp wage increases. This barrage is bound to accentuate the employees' natural aversion to excessively high profits.

However, an employee's attitude toward the

(OVER)

profit reported by his own company may be quite different. Reasonable employees know that an adequate profit is necessary for the continuance of a going business. If they are provided with sufficient information regarding their employer's business, they may easily agree that its profits are not excessive under present circumstances, although they may continue to be rabid against lush profits generally.

It is still good policy to give employees as much information as possible about the details of the business which provides their jobs.

—pp. 75, 178, 180

* * *

OUR COSTLY MISTAKES: A report from the Ruhr states that German industrialists believe that production under present conditions is almost completely unprofitable. As a result, they are devoting about 80 per cent of current activity to plant additions, renovations, improvement of equipment, research and product development in anticipation of the time when production can be pushed more advantageously.

This apparent attitude of German industrial management comes to light at a time when Washington announces that the United States is re-examining its policy on German reparations with a view of altering it substantially—even to the extent of abandoning the formula adopted at Potsdam.

Thus it is likely that the third anniversary of V-E Day will find our nation still groping for a satisfactory solution to the problem of Germany. Every day it is becoming more and more apparent that if the United States and her allies had been more realistic in the Big Three conferences before and after V-E Day, the mess in Europe would not be as bad as it now is, German industry would be more intent upon current production than upon future hopes and the need of the Marshall Plan would be reduced considerably. —p. 79

* * *

OXYGEN SCORES AGAIN: More than 1200 heats of commercial grade steels, mainly low in carbon and all low in alloy content, have undergone oxygen treatment for elimination of carbon in two 42-ton electric furnaces at the Ambridge, Pa., plant of A. M. Byers Co. At first, oxygen was used to replace some feed ore, next to replace substantially all feed ore and finally the use of charge ore was discontinued as well.

This substitution of oxygen for ore has brought about these results: The normal heat cycle has been shortened, production rate in tons per hour has risen, other cost savings directly attributable to oxygen use amounting to 50 cents per ton have been realized and quality has been maintained and possibly improved.

To what extent these results can be duplicated in other electric furnace shops is problematical, but the experience points to another promising field for the advantageous use of oxygen in steelmaking. —p. 120

* * *

NEW FOUNDRY COUNCIL: Eight trade and technical foundry associations have organized the National Castings Council for the purpose of providing a medium for co-operative action on matters of mutual interest beyond the scope of the individual societies.

To anyone who is familiar with the work of the existing eight organizations in the foundry field, the formation of this industry-wide council is a gratifying development. It has a great opportunity to help in the co-ordination of the activities of the eight societies and in the long run its influence probably will enable each society to be more effective in the field of activity to which its efforts are directed. —p. 73

* * *

CURBING GRAY MARKET: Now that gray markets have been probed at local, industry and federal government levels, it is apparent that, while legal, they are similar in some respects to bootlegging during prohibition.

Everybody condemns gray market operations, yet it is clear that the tonnage of steel handled in this market has kept in operation hundreds of plants which would have shut down or curtailed activities had not gray market steel been available. Also it is clear that most legitimate producers and distributors have gone to extraordinary pains to try to curb gray market operations.

While there may be preventive measures that have not yet been tried, most people will agree that in gray markets as in bootlegging the only sure-fire remedy is to remove the source of temptation. Continued high production, coupled with continued vigilance against and publicity for offenders, probably is the most effective weapon now available. —p. 69

E. L. Shaner

EDITOR-IN-CHIEF

Welded Design Cuts Costs 20%, Improves Saleability

By Louis E. Kibler, Engr.
A. K. Robins & Co., Inc.
Baltimore, Md.

THE urgent need for hard-to-get parts used in the conventional construction of the "goosenecks" for our food conveyors prompted us to redesign them to an all welded steel construction. The new design has netted us savings of 25% in fabricating time and of 20% in material costs. (Fig. 1.) Furthermore, the appearance of the finished machine has been enhanced considerably and the weight reduced 92 pounds, improving its saleability.

The original design of "gooseneck" involved an assembly of three separate parts bolted together. (Fig. 2.) The parts had to be milled, drilled and then tapped. The assembly also required careful matching and fitting of each side frame unit before bolting the parts together.

Our new welded design eliminates the need for any jigs or fixtures. In place of the former "gooseneck" component parts, the new design specifies 3/16" steel plate sheared from stock to any desired angle and size to comprise the side frame sub-unit. The angle iron tracks and guides are welded to the side frame and then notched. The tracks and guides are bent to the required angle to conform with the shape of the steel plate, clamped into position and welded one piece at a time with a Lincoln "Shield-Arc Jr." D.C. welder and "Fleetweld 37" electrode. (Fig. 4.) In the "gooseneck" assembly alone, the weight has been reduced from 67½ to 44½ pounds.

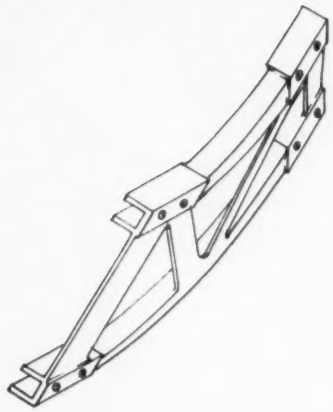

Fig. 2. Original "gooseneck" assembly. Weight 67½ lbs.

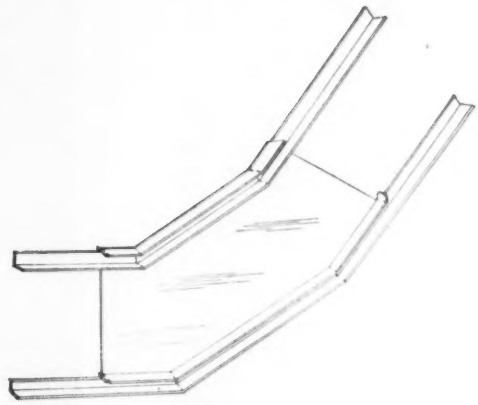

Fig. 3. Redesigned "gooseneck" of arc welded parts. Weight 44½ lbs.

An additional sales advantage of the welded conveyor is the fact that we can now match the customer's needs more readily by supplying any size or angle of "gooseneck." In our previous design little change in detail could be accommodated without involving a prohibitive expense.

To gain the same advantages on other sub-units of our conveyor the tanks, frames, drive pulleys and brackets have also been converted to welded design.

Fig. 1. All welded design food conveyor for the canning industry.

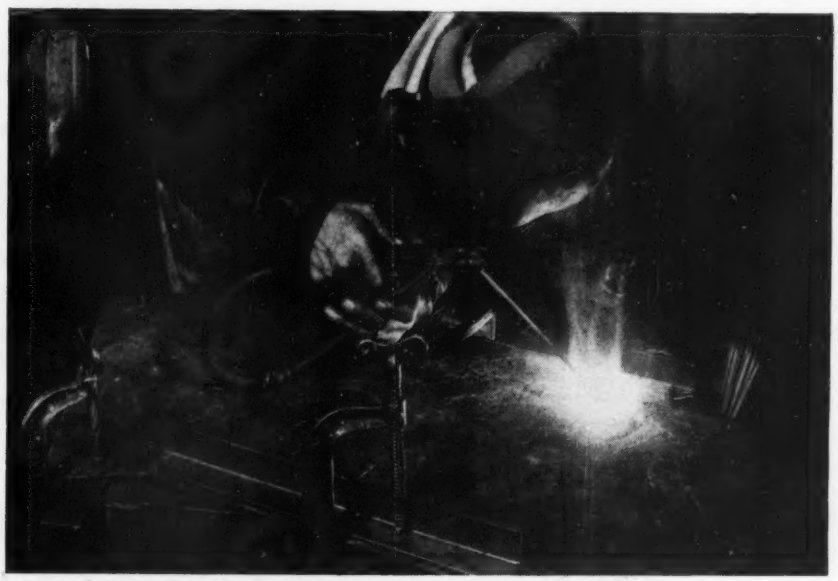

Fig. 4. Arc welding the guides to the side frame plate.

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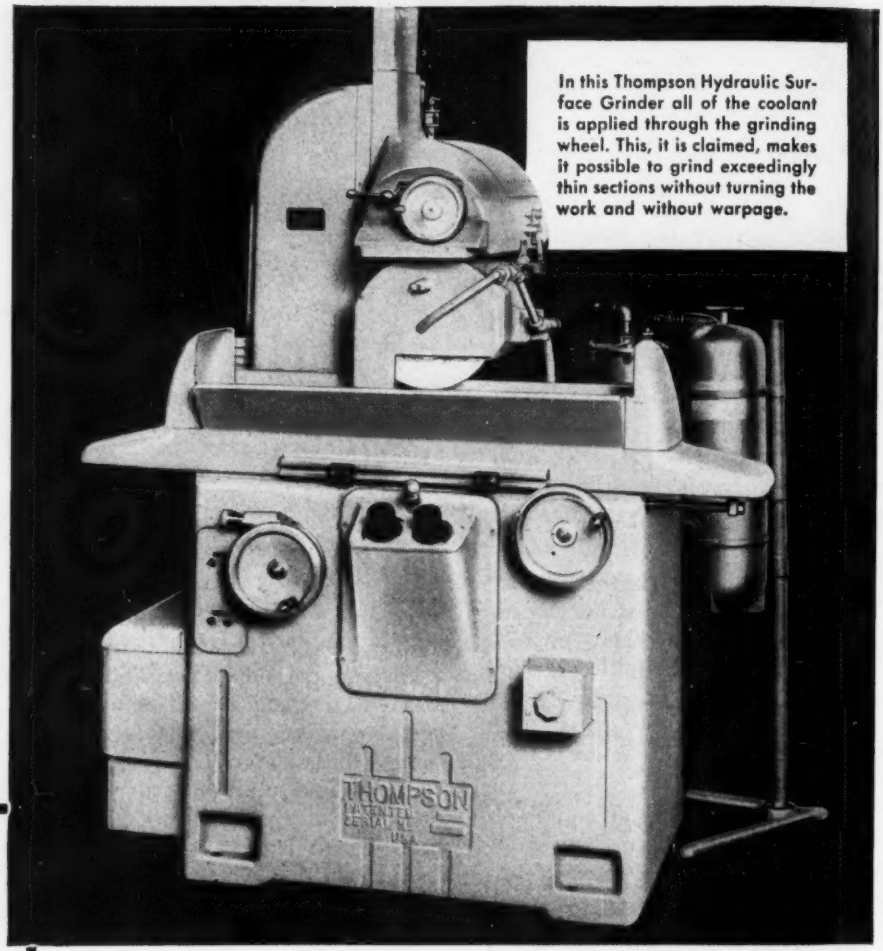

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News Summary

BELL FOR THIRD ROUND—"We're asking 30 cents but we'll settle for less." This describes the third round wage demands now in process of being formulated or announced. United Automobile Workers (p. 83) wants 15 cents an hour straight wage increase, 10 cents for pensions, 5 cents for insurance (which may be peddled by the Roosevelt boys) and 1 cent for extended vacation allowances. United Steelworkers will meet Feb. 18 (p. 73) to draft its wage program, to be presented to practically all the basic steel industry and to many other companies in the metalworking industry.

ALLOCATIONS—Lack of enthusiasm continues to characterize the voluntary allocations program for steel and other scarce materials now being established in Washington. Farm equipment industry, second to be organized, is rather noncommittal. Freight car program may be scaled down from 14,000 units monthly to 12,000, or possibly even 10,000 units. Some observers now believe the entire allocations program will not involve more than 2 million tons, in addition to that now being shipped to the favored programs.

PETROLEUM TAKES STEEL—Oil country goods requirements to build up the domestic petroleum industry will take an average of about 50 per cent more steel (p. 80) in each of the next four years than the million tons used in 1946. Pipelines now building will keep fabricators of line pipe busy for the next several years. In addition, Secretary of Interior Krug is pushing a huge synthetic fuel program (p. 81) which would require 16 million tons of steel over the next five to ten years.

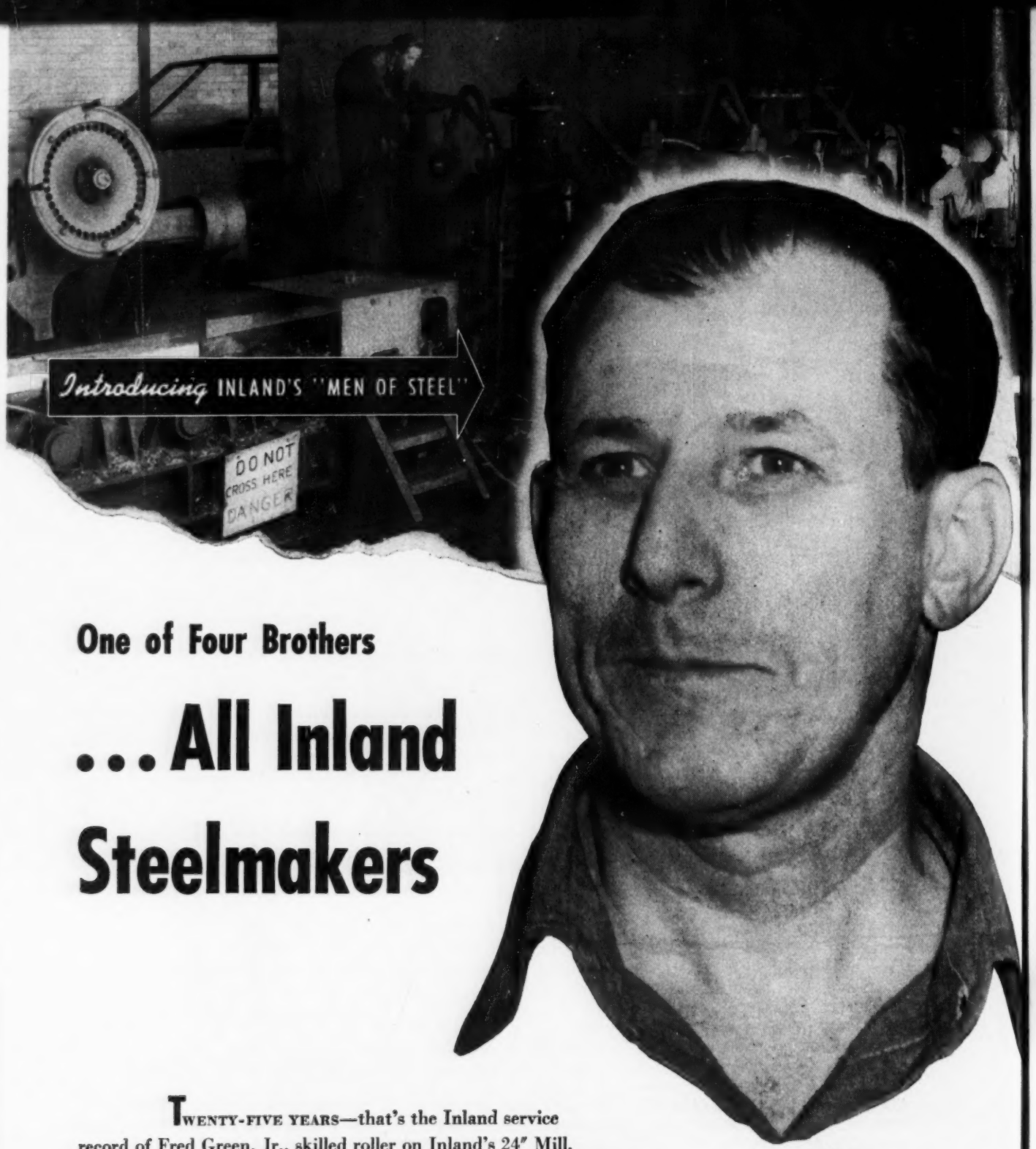
STEEL FOR EUROPE—State Department representatives estimate (p. 74) the equivalent of 4 million tons of ingots will be shipped to Europe under the first year of operation of the European Recovery Program. No shipments of scrap are now contemplated, and raw and semifinished requirements will be scrutinized carefully. Transportation equipment requests also will be reduced.

FOREIGN—German manufacturers, unable to make a profit on present production, are aiming at future markets and a large share of their expenditures (p. 79) are in preparation for future competition, in plant additions, equipment, research and product development.

STEEL SUPPLY—Where can we get steel? Week after week, this is the question most asked by metalworking companies. And for the present, there appears no satisfying answer. The stamping industry last week reported a survey (p. 72) of its members on steel procurement problems, in which 93 per cent said they would not be able to obtain the steel they need in 1948, 90 per cent believed they would receive no more this year than in 1947. Tool and die makers (p. 73) have asked the Commerce Department to give them whatever protection is possible on steel supplies.

IRREGULAR PROCUREMENT—The steel shortage, which is limiting production of a majority of metalworking companies, keeps alive and vigorous the irregular practices (p. 69) for obtaining material in a tight market. Offerings by brokers at prices higher than a few months ago are accepted eagerly by steel-hungry buyers. Swaps between consumers to obtain steel of the correct sizes and specifications are fairly common. Scrap-to-ingot-to-finished-steel conversion deals are flourishing despite high cost of steel involved and the necessity for the consumer to pay enormous freight charges.

SIGNS OF THE TIMES—Approach of the Republican Congress to the federal budget (p. 76) this year is considerably more cautious than last when widely advertised reductions failed to materialize. . . . Continuation of the Reconstruction Finance Corp. (p. 76) after June 30 is virtually assured. . . . Henry J. Kaiser (p. 75) continues to press for adjustment of the debt on his Fontana steel plant. . . . Turnover rates of hourly wage employees at Ford Motor Co. (p. 84) dropped 37 per cent in 1947, reflecting in part improvement in industrial relations program. . . . Wholesale prices (p. 88) advanced for the eleventh consecutive week.



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Conversion, Swaps, Gray Market Widespread

STEEL
February
2
1948

Steel tonnage involved in fringe markets unknown but it is playing important role in supporting high-level metalworking operations

Coils of thin strip steel such as these flowed from McDonald Works of Carnegie-Illinois Steel Corp. in greater quantity in 1947 that in any previous year

HOW MUCH so-called "gray" market and ingot conversion steel is moving into consumption is anyone's guess, but it is clear the tonnage is substantial, and is playing an important role in supporting metalworking operations from virtually one end of the nation to the other.

Without access to such open-market steel, many firms, especially newcomers in business lacking historical position with the steel mills, would be forced to sharply curtail operations, some of them close down completely.

Seek Supplementary Supply — Spot survey by STEEL indicates consumers increasingly are seeking supplementary supplies through purchase of high-priced steel on the "gray" market, and through ingot conversion deals.

Many metalworking plants at Pittsburgh are participating in steel conversion deals. In some instances the only alternative is to close. For most, a sharp reduction in production schedules would be certain. It is no secret ingot conversion has upset efforts to stabilize scrap prices.

Take Commitments—A number of integrated steel producers with excess finishing facilities have taken commitments for conversion of ingots, slabs and other semifinished items, for resale of the finished product at the going market. This procedure has made more finished steel available at regular price levels, but such activities have encouraged frantic steel consumers to obtain semifinished items at exorbitantly high prices for sale to the mills at lower price levels.

Certain integrated mills, realizing the effects of this wild scramble for semifinished with resulting adverse effect on scrap and other raw material prices, are refusing to convert ingots originating from another steel producer known to have produced the same from scrap bought above price ceilings established by major mills.

Highly Complicated — Conversions, swaps and "gray" market purchases of steel, probably in that order, are routine, although still highly complicated transactions, in the Detroit automotive and parts industries. It is impossible to estimate total tonnage involved in such arrangements. In proportion to total consumption, the amount is insignificant, but in terms of meeting emergency needs and providing the margin necessary to hold assembly operations above break-even point, it is a matter of critical importance.

At least five steel companies, operating electric furnaces, have participated in contracts to produce carbon steel ingots from scrap. At the start, the pressure on the scrap market was highly inflationary, although some semblance of order has been reestablished and prices paid for scrap run about $5 per ton over the delivered price of heavy melting grades.

In fact, it is understood the mills are insisting scrap for conversion must hold to this formula or no ingots will be rolled. Charges for conversion of ingots to slabs are reported in the range from $12 to $22 per ton, with the roller retaining all cropped scrap. Where a mill receives ingots from another source and has soaking pit and rolling capacity to process them down to finished sheets, the arrangement may be to pay the published price for the ingots—$90-$95 for rerolling quality—and then charge the published price for the sheets, freight extra. Since 25-30 per cent scrap originates in such rolling, with a value of $40 a ton or more, the "leavings" are a highly profitable item.

Most Auto Firms Participate— Nearly all the automobile companies

are having ingots made for their accounts on scrap conversion arrangements. There is nothing illegal, reprehensible or "gray market" about such contracts. The headaches for the buyer are terrific, as are the costs of locating the necessary melting and rolling capacity, and transshipping the product all over hell's half acre before the flat-rolled steel is received.

Monthly tonnage of ingots made on scrap conversion contracts is estimated in the neighborhood of 60,000-75,000 tons. It fluctuates widely from month to month, and at the present time probably has reached or passed its peak.

Dozens of cases of complicated exchanges of one grade of steel or one size of steel for another, or scrap for steel, or steel for pig iron, etc., make good luncheon conversations.

The "gray" market in sheets and strip appears to thrive in the Chicago district because of support from smaller consumers unable to obtain adequate supplies from mill sources or warehouses. In many instances the amount of sheet steel in a finished product is small so it is not too difficult for the manufacturer to absorb the "gray" market mark-up.

Situation Corrected—About a year ago when conversion of ingots or semifinished steel was undertaken by mills with finishing capacity in excess of ingot capacity, it was discovered some converted sheets and strip found their way into the "gray" market. Efforts were made to correct this situation by limiting future conversion to known consumers.

Only one steel mill in the Chicago district has engaged in conversion and it has controlled this operation diligently. Demand for conversion has been so great that customers were put on a quota basis, the quota bearing a relationship to the customer's established mill quota. Currently, this company is reducing its conversion, and volume for second quarter will be below that of the past two quarters. Reason for this is that a substantial carryover has developed because processing operations have entailed more time and delay than figured—for example, the heating of cold ingots.

West Coast Pinched — Out on the West Coast sheet users report they are purchasing ingots and shipping them east for conversion to cold-rolled sheets. One plant is now operating at a greatly reduced schedule, but would have had to close down entirely if it hadn't been for its program of ingot conversion. Sheet buyers in Los Angeles report many calls daily offering sheets at from 12 to 17 cents per lb.

P. J. Kurens, president of Hillside Metal Products Inc., Queens, N. Y., last week testified before a House Public Works Subcommittee that he could not operate his small plant without "gray" market steel

At most other manufacturing centers the situation is much the same as at Pittsburgh, Chicago and Detroit. In the Cleveland area the price trend on "gray" market sheets has been upward recently with the material reported being offered at 15 cents per lb as against 12 cents some time back.

At Youngstown rumors are heard of an increase in "gray" market activities but it is difficult to develop anything definite. One large fabricator reports he has received offers of steel for the first time within the past few weeks. One of these offers was from as far away as Boston.

On Decline in East — In the East, while "gray" market operations are on the decline compared with some months ago, the trade is given to increasing speculation as to the possible effect on the proposed voluntary allocation program being worked out by the government.

One important contributing factor to the "gray" market over past months was the tonnage which leaked through from operation of the housing program.

No little "gray" market steel in the past has leaked out through export channels.

Meanwhile some domestic "gray" market transactions in sheets are reported at $250 a ton with some tonnage being held as high as $275.

Complicated Transactions — Some very complicated transactions are reported. One recently involved several hundred tons of ingots to be shipped to another interest for breaking down and then on to still another for final rolling. Such deals involve considerable uncertainty. Many proposed transactions are fantastic and are never culminated. Many strange characters bob up, many with no previous experience whatsoever in steel. The recent Follansbee Steel Corp. stock deal story highlights some of the weird goings on.

Mills Seek Corrective — Steelmakers have been running down reports of steel produced by them filtering into the "gray" market, and where evidence has been developed showing diversion to brokers and others for resale they have taken action, withholding further shipments to the consumer involved, or reducing originally established quotas.

In Washington last week the House Public Works Committee's Macy Subcommittee to Investigate Black Markets developed testimony from two steel consumers about their dealings with A. Terry Fahye of New York, alias Albert Bennett-Fey, alias Alan Adams Haye.

Julius Klein, vice president, Caloric Stove Co., Philadelphia, said Fahye in November last year offered to help him get 10,000 tons of sheets if he would pay a price netting Fahye $1,100,000. Fahye recently was questioned (STEEL, Jan. 26, p. 23) about proposed purchase of 183,000 shares of Follansbee Steel Corp. stock. Last week, under oath, Albert Bennett-Fey appeared before the committee and testified he also used the names of A. Terry Fahye and Alan Adams Haye. He said a deal to buy the Copperweld Steel plant at Warren, O., "fell out" because the company wanted $1 million for an option and he didn't have the million. He said he also had tried to lease a government plant at Birdsboro, Pa.

P. J. Kurens, president, Hillside Metal Products Inc., Queens, N. Y., manufacturer of office cabinets, said he tried to get steel from United States Steel Corp. subsidiaries, Follansbee Steel Corp., and from legitimate warehouses. But he had no "historic" position with such companies as a customer and was told there was no steel to spare beyond requirements of regular customers. He advertised for steel and paid high prices to get it.

Steel Not Available — Prices charged on the "gray" market, said Mr. Kurens, range from $260 to $280 a ton for sheets that sell at the mill for $80 to $90, and from warehouse stocks at around $130.

Allocation Program Hits Snag

Industry opposition to government controls gathers momentum, with farm equipment makers and automobile producers showing resistance

WASHINGTON — Industry opposition to any control system, including the projected voluntary setup and the mandatory controls requested by President Truman, gathered momentum last week. One immediate effect was to slow down development of the voluntary program.

The first snag was struck when the second industry to be called in by the Office of Industry Co-operation—the farm equipment industry—refused to commit itself to this program. When representatives of the 42 companies that are the backbone of the farm equipment industry met here last Tuesday with Assistant Commerce Secretary, David Bruce, Director of the Office of Industry Co-operation, John C. Virden, and Director of the Office of Domestic Commerce, H. B. McCoy, they listened to a description of the setup permitted under the anti-inflation law.

Various spokesmen voiced the desire of the industry to work with the government and in the public interest but they were not sure whether the voluntary program now being worked out is desirable in all respects. The only action to which they were willing to agree was appointment by Commerce Secretary Harriman of a Farm Equipment Industry Advisory Committee.

Another snag came from the opposition of the influential automobile industry which decided to act without waiting for a call to Washington. A strong statement of opposition to all controls was prepared for presentation before the Senate Banking & Currency Committee by John Middlekamp, vice president, Mack Truck Co., on behalf of the entire industry.

To Meet Steel Producers — Commerce officials, including Mr. Virden, on going into the meeting with the Steel Producers Advisory Committee, planned to discuss four programs with the steel men, namely farm equipment, petroleum equipment, housing, and transportation needs, but were not ready to make firm demands for any specific tonnages.

In general, however, there was a tendency to moderate original ideas. For instance, instead of setting freight car production at 14,000 units per month starting Apr. 1, as called for by a recent White House directive, there now is a feeling that such an increase may not be feasible and that possibly 12,000 cars a month may be sufficient. In fact, there was admission that perhaps the present production of 10,000 cars monthly may be enough. As to locomotive and rail requirements to be covered by voluntary allocations, there has been no freeze yet.

Signals Changed—The signals have been changed in regard to the three Office of Industry Co-operation consultants from the steel industry, David Austin, vice president, U. S. Steel Corp., Walter Watson, vice president, Youngstown Sheet & Tube Co., and J. K. Beeson, executive vice president, Pittsburgh Steel Co., who were named a week ago. It originally was intended they would spend their full time in Washington as consultants to John C. Virden, director of the Office of Industry Co-operation, and had been given office space in the 300 corridor on the fifth floor of the Commerce building. They were to work at their new job full-time "without compensation." However, it has since been decided that, while they will serve as consultants to Mr. Virden, they will spend most of their time in their jobs with the three steel companies. They will help Secretary Harriman select a full-time man to head up a new unit about to be created, the Iron & Steel Division of the Office of Industry Co-operation.

Virden Gets Assistants—Harriman has appointed the following assistants to Mr. Virden: Horace W. Reid, chief legal adviser, Matthias W. Niewenhause, special consultant on building materials, Augustus K. Tigrett, special consultant on transportation requirements, and Clifford A. Hahn, special consultant on all classifications of industrial machinery.

Efforts to ascertain the size of the total steel tonnage over and above present consumption that may be called for under voluntary allocations do not yield any positive answers but those close to the different programs now think a smaller steel increment will be involved than originally expected. There now seems good reason to believe the amount above present consumption to be requested under allocations will not exceed 2 million tons annually for all programs, at least as the picture so far has unfolded.

DAVID AUSTIN
Vice president of United States Steel Corp.

WALTER WATSON
Vice president of Youngstown Sheet & Tube Co.

J. K. BEESON
Executive vice president of Pittsburgh Steel Co.

Columnar Pricing Explained

Method outlined in response to inquiries arising after a leading producer changes pricing of nails to the system long in use on other merchant wire products

RECENT adoption of the columnar system of mill pricing on nails by one leading producer has brought forth questions as to what is the columnar system.

The columnar system, while new in the pricing of nails, has for many years been used in pricing other merchant wire products, such as woven wire fence, barbed wire and steel posts.

Specifically, the columnar system shows the delivered net price of any specific size to a mill customer. Under the old base and extra method of pricing nails, a mill customer had to add the freight, calculate the tare on the freight, and include extras, such as size and finishing, in order to arrive at his delivered cost.

Only One Figure — Inasmuch as under the columnar system only one figure—the delivered net price—is of concern to the buyer, the mill prepares tables showing delivered prices on each size, which includes transportation charges. These tables are printed in ready reference form. A mill customer can tell at a glance the cost of an item delivered his railroad freight station. Furthermore, the tables speed billing.

Under the columnar system, numerous columns are set up to show delivered prices because of the wide range in freight rates. The column serving as base depends on the price base of a producer. One company has set up a table of columns on nails in which each successive column represents about a 5c-per-100-lb increase over the preceding column. For instance, if the price of a certain size and type of nail under column 94 is $5.65 per 100 lb, the price in column 95 would be about $5.70.

Here is how the customer determines the column applying to his purchases: To the base column he adds the proper freight from the mill to the delivery point, thus determining the column of prices applying at his point.

For instance, if the base column at, say Pittsburgh, is 94, and the mill customer in another city knows the rail freight is 40c per 100 lb he adds eight columns (each column representing 5c) to the column 94 and therefore refers to column 102 for the exact delivered price. If the freight rate is an odd figure, the nearest lowest multiple of five is used. For example, if the freight rate were 38c seven columns would be added.

Price Is Pre-Figured—For each product, the mill has pre-figured the column price over a wide range of columns, so whatever column is applicable is readily available. Each column represents in dollars and cents the combination of the price base plus extras and freight, which formerly resulted in the net delivered price. The lowest column set up by one company on nails is column 94 which under the former system is approximately equivalent to a price base of $4.75 per 100 lb f.o.b. basing point.

With a wide range of tables worked out in advance, a change in price bases or freight rates requires only the use of different columns. For example, if the price base were column 94 and the price base rose 5c per 100 lb, the base column would be 95. If the price base remained steady but freight rates increased, the mill customer would use an appropriately higher column number than he had been using. For instance, if the mill customer had been using column 96 to find his delivered price he would use column 97 if there were a freight rate increase of 5c per 100 lb.

Mill customers are provided with ready reference column tables by their mill suppliers, or can obtain them from their suppliers. A company can vary its prices merely by using whatever column it chooses as base.

The columnar method is said to be adaptable only to products where a considerable degree of standardization prevails.

Stampers Expect No Supply Increase

MORE than two-thirds of the pressed metal manufacturers started 1948 with an average of 45 per cent less steel in inventory than last year, and over 90 per cent do not expect to receive any more steel this year than in 1947 or to obtain sufficient steel for their needs, survey by the Pressed Metal Institute, Cleveland, shows.

Figures were based on returns of over 20 per cent of the institute's membership located in 11 states. The survey discloses over two-thirds of the members of the institute had been refused steel by mills with whom they had a historical position and three-quarters had been limited by suppliers as to the specifications of steel ordered or the size of order that will be accepted.

In reply to the question, "What is your steel sheet and strip inventory as of Jan. 1, 1948, compared to Jan. 1, 1947?" 18 per cent reported their inventory of Jan. 1, 1948, ranged from

(*Please turn to Page* 177)

PIG IRON, FERROALLOY OUTPUT FOR DECEMBER AND ENTIRE 1947 YEAR

Blast Furnace Capacity and Production—Net Tons — DECEMBER - 1947

	Number of companies	Annual blast furnace capacity	Production: Pig Iron — Current month	Pig Iron — Year to date	Ferro Manganese and Spiegel — Current Month	Ferro Manganese and Spiegel — Year to date	Total — Current month	Total — Year to date	Percent of capacity — Current month	Percent of capacity — Year to date
DISTRIBUTION BY DISTRICTS:										
Eastern	11	12,551,280	939,248	*10,877,952	30,778	*329,235	970,026	*11,207,187	91.2	89.3
Pittsburgh-Youngstown	17	25,042,040	2,036,478	*23,023,515	28,364	216,876	2,064,842	*23,240,391	97.3	92.8
Cleveland-Detroit	6	6,557,500	478,819	5,830,471	-	-	478,819	5,830,471	86.1	88.9
Chicago	7	14,097,710	1,048,660	12,546,703	9,132	21,941	1,057,792	12,568,644	88.5	89.2
Southern	8	4,924,670	384,852	*3,982,874	10,991	*123,212	395,843	*4,106,086	94.8	83.4
Western	4	2,536,000	209,815	*2,245,654	-	11,297	209,815	*2,256,951	97.6	89.0
TOTAL	37	65,709,200	5,097,872	*58,507,169	79,265	*702,561	5,177,137	*59,209,730	92.9	90.1

* Adjusted.

Foundrymen Form National Castings Body

NATIONAL Castings Council, consisting of the American Foundrymen's Association, Foundry Equipment Manufacturers Association, Foundry Supply Manufacturers Association, Gray Iron Founders' Society, Malleable Founders' Society, National Founders Association, Non-Ferrous Founders' Society Inc., and Steel Founders' Society of America, has been organized to provide a medium for co-operative action on matters of mutual interest beyond the scope of the individual societies.

Officers Are Elected — The council has elected the following officers: President, Howard A. Stockwell, secretary, Barbour Stockwell Co., Cambridge, Mass., and president, Gray Iron Founders' Society; vice president, Otto A. Pfaff, president, American Wheelabrator & Equipment Corp., Mishawaka, Ind., and president, Foundry Equipment Manufacturers Association; treasurer, F. Ray Fleig, president, Smith Facing & Supply Co., Cleveland, and president, Foundry Supply Manufacturers Association; secretary, Frank G. Steinebach, editor, *The Foundry,* Cleveland.

Recent formal organization meeting was devoted to discussion of the organization of by-laws of the council. The representatives on the council also discussed problems connected with safety codes, establishment of a clearing house for convention and meeting dates of organizations in the foundry industry, contact with the Munitions Board with regard to the organization of advisory committees for the foundry industry, and development of programs for apprentice training.

Discussion also included present difficulties with raw materials supply; the organization of the Office of Industry Co-operation by the Department of Commerce; and the report of the successful fund-raising campaign of the Foundry Educational Foundation.

Electrical Engineers Meet at Pittsburgh

New developments in power generation, distribution and controls as pertaining to the mining and steel producing industries highlighted the winter general meeting of American Institute of Electrical Engineers in Pittsburgh, Jan. 26-30. Approximately 2500 attended the 5-day conference.

In addition to the technical sessions, conference highlights included 14 plant visitations.

Dr. Joseph Slepian, associate director, Westinghouse Research Laboratory, received the Edison gold medal as "the man who did the most to break through three of the major barriers standing in the way of the great expansion of electric power in the last 30 years."

The numerous papers presented at the 5-day conference fell into four general subject groups — industry, power, communications and science, and general applications group. Three sessions of the industry group were devoted to power distribution.

The institute's summer general meeting will be held in Mexico City, June 21-25.

Tool and Die Makers Seek Assurance on Steel Supply

Officials of the Department of Commerce were told last week as much protection as possible should be given smaller manufacturers on steel supply. This plea was made by W. R. White Jr., president, National Tool & Die Manufacturers Association, Cleveland, who met with other directors of that group in Washington to discuss problems of the industry with government officials.

Mr. White pointed out most smaller firms are in less essential lines and would be seriously crippled if they receive less steel than the inadequate amounts most are now getting. Many tool and die shops obtain tooling business from these smaller manufacturers, and frequently make metal specialties of their own.

Under Secretary W. C. Foster of the Department of Commerce had explained plans for channeling more steel into a few highly essential programs, but indicated that these industries will be asked to take less for other uses. The additional steel capacity to be in operation this year will help. The Commerce Department plans to hold hearings at which any anticipated disproportionate hardships can be brought to the attention of officials for such relief as may be possible. The Office of Small Business has the responsibility of championing the needs of small business for steel and will insist that the percentage of steel going to warehouses be maintained at about present levels, which are higher percentagewise than ever before.

At the directors' meeting, reports from some centers regarding the business outlook were encouraging; from others, only fair. Stamping dies and special machinery are the types of special tooling most in demand. Little change in employment in the tool shops was reported.

Steelworkers To Draft 1948 Wage Demands

Wage demands to be presented to the steel and metalworking industries by the United Steelworkers of America-CIO this spring will be formulated at a meeting of the union's 170-member Wage Policy Committee in Pittsburgh Feb. 18.

Contracts in the basic steel industry generally run to Apr. 30, 1949, but provision is made for reopening the wage section of the contracts by submitting formal notice on Apr. 1, 1948.

The union's official publication, *Steel Labor,* has indicated in recent issues that the steelworkers will ask for a substantial wage increase and will argue its case on the increase in the cost of living and the industry's profit showing for 1947.

Other CIO unions which already have announced their wage goals for 1948 generally are naming 30 cents an hour in their initial demands. This is expected to be scaled down substantially as bargaining progresses. United Automobile Workers, for example, is asking a 15-cent hourly increase, plus 10 cents for pensions, 5 cents for insurance program and an additional cent for extended vacation allowances.

General Motors Cited—Robert N. Denham, general counsel for the National Labor Relations Board, last week filed a complaint against General Motors Corp. charging violation of the Taft-Hartley law by refusing to bargain with the UAW on a union-proposed insurance plan. The complaint also charged the company tried to enforce a plan drafted by the company without consulting the union. Hearings on the complaint will start in Detroit Feb. 10.

Industrial Advertisers Hold Pittsburgh Show

Pittsburgh's first industrial advertising exposition, sponsored by the local council of National Advertisers Association, will be held Feb. 5 at the Roosevelt Hotel, Pittsburgh. Exhibition will display industrial advertising and sales promotion examples and products of supplementary services produced by industries within a 50-mile radius of Pittsburgh.

Industry Still Expanding on West Coast

SAN FRANCISCO

CALIFORNIA'S wartime shift from an economy based primarily on agriculture to one of the nation's top-ranking industrial areas continued in 1947. As a result, manufacturing employment in the state reached a new peacetime high.

For the long-range future, last year's trend is important. It indicates California will have a broader base of industry to absorb the population which still is trending westward. Increased industrialization also is making the West more self-sufficient in production of consumer and durable goods.

Breeds New Expansion—At the same time, expanding industry in turn is breeding new expansion. That is illustrated by the increasing number of metal fabricating plants which are being installed in Utah, near the Geneva steel mill, and in California, where Columbia Steel Co. (U. S. Steel subsidiary), Bethlehem and Henry Kaiser's Fontana steel mill are expanding steel producing facilities.

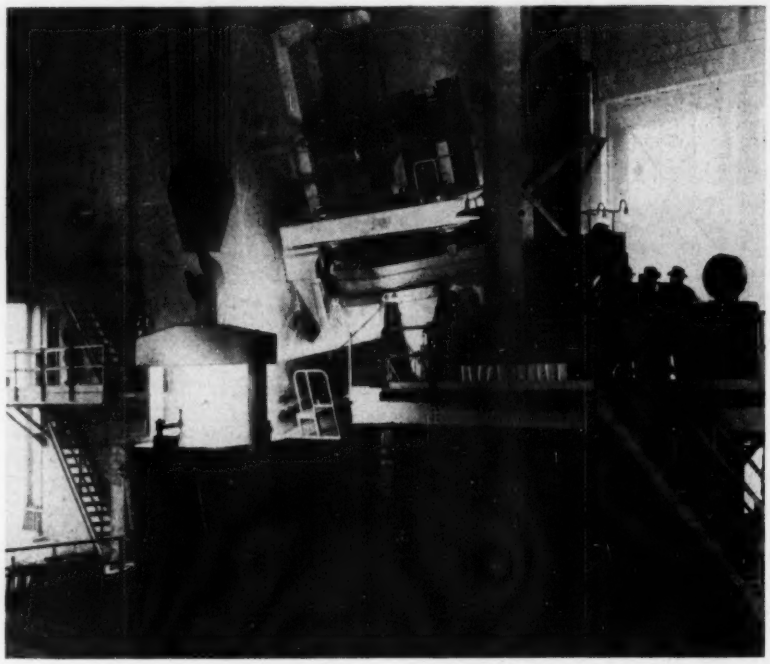
Although complete figures for industrial expansion throughout California have not yet been compiled for 1947, the report for northern California and the San Francisco area indicates the scope of industrial growth last year.

New industrial projects reported last year in northern California totaled 481 new plants, valued at more than $79 million, 335 expansions of existing plants, the cost of these expansions totaling nearly $73 million. Total expansion thus was 816 projects valued at $152 million.

Most of this expansion took place in the San Francisco area, where there were 664 projects valued at $126 million.

Heavy Industry Leads—Many of these new plant additions or expansions were in heavy industry. As a result employment in California's durable, or heavy, goods industries increased more above prewar levels than in the light goods category.

Last year's manufacturing employment in California averaged 712,000 persons, a gain of 5 per cent over the 1946 level of 677,000. Compared with 1940, last year's average showed a gain of 80 per cent.



NEW ELECTRIC FURNACE: This 50-ton electric furnace recently began operation at the Los Angeles plant of Bethlehem Pacific Coast Steel Corp. Completion of this installation marks a step in the $14 million expansion program designed to double capacity of this facility

How Much Steel for Europe?

EQUIVALENT of about 4 million tons of ingots will be shipped to Europe in the first year of operation of the Marshall Plan, as now proposed, Willard L. Thorp, Assistant Secretary of State for Economic Affairs, estimated in New York recently.

No shipments of scrap to Europe are now contemplated and shipments of raw and semifinished steel will be lighter than planned, despite the urgent need abroad. However, these reductions will be offset in part by scheduling shipments of finished steel at "above the current rates." Considering all types of steel involved—raw, semifinished and finished—he believed the estimate of 4 million-ton ingot equivalent was reasonable.

Mr. Thorp spoke at the 293rd meeting of the National Industrial Conference Board at the Waldorf Astoria, Jan. 22.

Appeals for Support—As one of three speakers, Mr. Thorp appealed strongly for support of the program and declared that opposition to the administration's estimate of $6,800,000,000 for Europe's initial recovery needs was based on fallacies. He was supported in principle by Maj. Gen. William J. Donovan, Buffalo, who described the Marshall Plan as "an indispensable first step" in this country's fight for peace, but was opposed by Senator C. Wayland Brooks, Ill., (R), who argued that if the $17 billion proposed for long-term aid was turned over to the 16 European countries, it would be "dissipated the same as the $3,750,000,000 given to Great Britain to subsidize their Socialistic governmental practices."

War Not Inevitable—General Donovan made a plea for the peacetime equivalent of an agency similar to the Office of Strategic Services, which he headed during the war, to counter Soviet fifth column activity. He thought war with Russia was not inevitable "if we can call upon our capacity and resolution to prevent it."

Cut Rolling Stock Program—Commenting upon the need for rolling stock abroad, Mr. Thorp said that while the Paris report included an estimated import requirement of 103,000 freight cars, 47,000 in the first year, the schedule has been revised in Washington to 20,000 cars in the first year and 6000 in the second. He estimated that western Europe's requirements of equipment for the generation and transmission of power amounted to about $80 million, of which about $69 million will presumably be spent during the four-year period, and only $12,500,000 during the first 15 months.

Debt to RFC Perils Fontana, Says Kaiser

FONTANA steelworks will be forced either to close down entirely or raise its prices at least $36.76 per ton of steel to meet its Reconstruction Finance Corp. loans, Henry J. Kaiser declared at a recent meeting of the Senate Banking & Currency Committee which has begun hearings on the question of re-financing the Kaiser interests' California steel plant.

This latest action is an aftermath of the RFC refusal last summer (STEEL, Aug. 18, p. 61) to forgive over $85 million of the $105 million still outstanding in loans to the Fontana facility. At that time RFC pointed out that it would take congressional action to approve such a proposal.

Presents Three Plans—In his testimony, Mr. Kaiser presented three related proposals to meet the situation. (1) He advocated a $45 million expansion program to convert Fontana into a well-rounded facility with an integrated range of peacetime products. The expansion would consist primarily of facilities for the production of sheets, strip and tin plate, to supplement a new pipe mill already installed. Mr. Kaiser estimated that with these additions the Fontana mill could produce at least 300,000 more tons of steel ingots annually and 750,000 more tons a year of finished steel products. (2) He urged modification of the payment schedule for present RFC loans. (3) He also again presented the proposal by the Steel Committee of the Western States Council that congress permit writing off part of the RFC loans.

Mr. Kaiser declared that if the first portion of his plan were not put into effect, there would be no other alternative than to close Fontana or raise his prices.

RFC Rebuttal—In commenting on these proposals, John D. Goodloe, chairman of RFC, pointed out that his organization never had denied that it would be advisable to convert Fontana to a more integrated basis. The issue, he said, is not this, but the question of whether RFC from a sound business standpoint should put even more than its present $105 million into the venture.

Congressional Action Necessary — In regard to the second proposal, Mr. Goodloe indicated that this was a matter for congressional decision because Public Law 312, approved June 30, 1947, provides that RFC may not make any additional business loans with a maturity past Jan. 31, 1955.

The RFC chairman, in commenting on the third proposal, reiterated his stand made last August. He denied that Kaiser's profit picture made payment of the debt unfair.

Raw Materials Are Steel's Big Problem

Obtaining sufficient quantities of raw materials to operate the steel industry's enlarged capacity is a problem still to be solved, W. S. Tower, president, American Iron & Steel Institute, told New York members of the American Institute of Mining & Metallurgical Engineers last week.

"Without increased quantities of raw materials, the recent and prospective expansions of capacity will be valueless as regards increased output of steel," Mr. Tower declared. If the industry were called upon to produce the limit of the 96 million tons of capacity to be available in 1949, it would need a minimum of about 115 million tons of iron ore, more than 100 million tons of coal, and huge quantities of purchased scrap, fuel oil, natural gas and electrical energy.

Mr. Tower said the industry thus far has not had such supplies available.

Amount of steel in use per capita in the United States now is between 12,000 and 15,000 pounds, three or four times the amount in use at the beginning of the century.

J&L's 1947 Net Income Placed at $22,383,591

Consolidated net income of Jones & Laughlin Steel Corp., Pittsburgh, and subsidiaries for the quarter ended Dec. 31 was $5,700,853, compared with $4,744,824 for the like quarter of 1946. Sales and operating revenues during these periods were $96,621,722 and $72,677,433, respectively.

The company's consolidated net income for the 1947 year was $22,383,591 on sales and operating revenues of $350,132,366 compared with earnings of $10,854,084 in 1946.

Present, Past and Pending

■ TOOL AND DIE SHOPS AT HIGH LEVEL OF ACTIVITY
DETROIT—Tooling orders for 1949 model automobiles have pushed operations of tool and die shops here to the highest level in over a year.

■ STEAM TURBINE DEMAND FAR AHEAD OF OUTPUT
SCHENECTADY, N. Y.—Five years will be needed for General Electric Co.'s steam turbine production to catch up with demand, says J. W. Belanger, manager, Turbine Division.

■ KAISER-FRAZER NEGOTIATES FOR PLANT PURCHASE
DETROIT—Kaiser-Frazer Corp. is negotiating with Continental Motors Corp. for purchase of Continental's Detroit plant. Previously, Kaiser-Frazer had announced it would spend $2½ million improving the plant, which it had under lease.

■ CLEVELAND COMPANY ADDS TO LINE OF PRODUCTS
CLEVELAND—Apex Electrical Mfg. Co. is scheduling production of automatic washers and clothes driers in 1948 in addition to its present line of cleaners, washers and ironers.

■ BRITISH IRON AND STEEL PRICES INCREASED
LONDON (by cable)—British Ministry of Supply has increased prices of pig iron and most iron and steel products, except those used in housing construction, by $1.80 a ton. Basic pig iron is now £9 3s 6d, or about $36.70.

■ GM SEEKS TO BOOST FLOW OF SCRAP TO MILLS
DETROIT—To help maintain production and employment, General Motors Corp. is urging its employees, dealers and divisions to increase the flow of scrap iron and steel to steel mills.

■ TRANSPORTATION EQUIPMENT SHIPMENTS SET RECORD
SCHENECTADY, N. Y.—Electric transportation equipment of more than a million horsepower was shipped in 1947 by General Electric Co. This all-time high output was more than twice the amount installed by the entire transportation industry in an average prewar year.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Republican congressmen approach President's budget cautiously. Promises of deep cuts in 1948 spending failed to materialize. Extent of tax reduction still in doubt

IN MARKED contrast to their confident predictions in January, 1947, of huge reductions in federal expenditures are the present cautious statements of congressional Republican leaders.

Following the President's announcement of $39.7 billion as the estimated budget for fiscal 1949, majority spokesmen announced that they contemplated slashing this figure by $3 billion. Now the matter is in the hands of the 102-man Joint Congressional Committee on the Budget which is trying to set up a legislative budget estimate by the middle of February. What the outcome of this effort will be is uncertain. Sen. Styles Bridges (Rep., N. H.), following his election as chairman of the joint committee, told reporters that any budget ceiling set up by Feb. 15 would be just a guess. It would take until Apr. 15, or even May 1, to make a really accurate estimate, he said, and then only if Congress sets up a staff of budget experts. Needless to say, even should Congress go about the creation of a continuing budget staff, it would take some time to round up a staff of experienced people and get them organized. So it begins to look as though last year's failure to set up a budget ceiling may be duplicated this year.

Governs Tax Load — The uncertainty over the budget, of course, is a factor of concern to business generally, because the size of the budget eventually must play a dominant part in dictating the size of the tax load. Not only is it exceedingly difficult to set the tax load in the absence of a budget ceiling, but there are complicating uncertainties, as, for example, the size of the national income in fiscal 1949. The economists estimate that the income is going to be exceedingly good—but the big majority of congressmen favoring immediate tax reduction realize that these estimates are merely guesses and may be quite wide of the mark. Hence, there is considerable grasping at straws in the shaping of the tax program.

For instance, the President based his budget on a national income of between $192 and $200 billion from June 30, 1948, to July 1, 1949. On that basis, the President estimated, income tax collections would be about $44.5 billion. Then along came the congressional tax expert, Colin P. Stam, with an estimate that a national income of this size would bring income tax revenue of $47.3 billion. He went on to the effect that a $3 billion budget reduction plus a $6.3 billion tax reduction under the Knutson bill would still leave around $3.5 billion surplus to apply to debt reduction.

How Deep a Cut?—That made Mr. Knutson and his majority associates on the Ways & Means Committee feel pretty good, and it was predicted that the Knutson bill would be approved by the House "probably" on Feb. 2 or 3. In the meantime, however, doubts as to the wisdom of so sharp a reduction have gained ground and now there are even doubts whether the Doughton version of the Knutson bill is sufficiently moderate. Mr. Doughton's bill, which would have considerable Democratic support, calls for a reduction of $4 billion in income taxes.

Whatever is done by the House, it seems quite likely that the Senate will cut down the size of the slice. A note of caution has been sounded there, especially in view of the failure of last year's predictions of House leaders to materialize.

What happened last year deserves some thought at present — for it points up a number of salient facts, as that Congress at present is in no shape at all to control national expenditures, that the cost of government continues to go up, and that we are enjoying a national income of a size which no reasonably minded economist expects to see maintained indefinitely.

Last Year's Budget Increased — Last year, it will be recalled, President Truman recommended a budget of $37.5 billion for fiscal 1948. Immediately there were positive predictions in Congress that this figure would be trimmed by $4 to $6 billion. In July, after the House Appropriations Committee had labored through its gigantic task, Chairman Taber announced that the President's request had been trimmed by $4.5 billion. But when President Truman came along with his August revision, he reported that whereas Congress had lopped off $1.5 billion it had added $1 billion in new appropriations—so that the net saving was only some $500 million. Then, in December, Congress voted more appropriations—notably $540 million for stopgap foreign aid and $31 million for additional reclamation work — with the result that the estimated budget for fiscal 1948, when the President reported to Congress in January, 1948, had mounted to $37.7 billion.

The federal budget fills a volume the size of a mammoth telephone directory, and is available from the Superintendent of Documents, Government Printing Office, at $5 a copy. It does not have wide distribution, for it is a book for expert accountants—and, according to statements by accountants themselves, does not contain nearly all the information required to understand the fiscal proceedings of the world's largest economic entity, the United States government. However, the budget is prepared by the only agency which does have all the information, the Bureau of the Budget. When the President reports budget facts and figures, he gets his information from the only original source.

After last year's experience, therefore, fewer congressmen are willing to go out on a limb with predictions as to how much the budget can be cut—so that it will stay cut when the fiscal year comes to an end. By the same token, there is much less confidence than last year as to the size of the income tax reduction the country can afford at this time.

RFC Continuation Seen

Continuation of the Reconstruction Finance Corp. beyond the present expiration date, June 30, 1948, is virtually assured. Sen. C. Douglass Buck (Rep., Del.), chairman of a Senate Banking & Currency subcommittee investigating the matter, said that his group would recommend extension of the RFC "with authority to make business loans in proper circumstances when private credit is not available, and with powers as a standby agency for economic emergencies." The report will recommend that the RFC be responsible to

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ADVANCED TYPE

(PATENTED)

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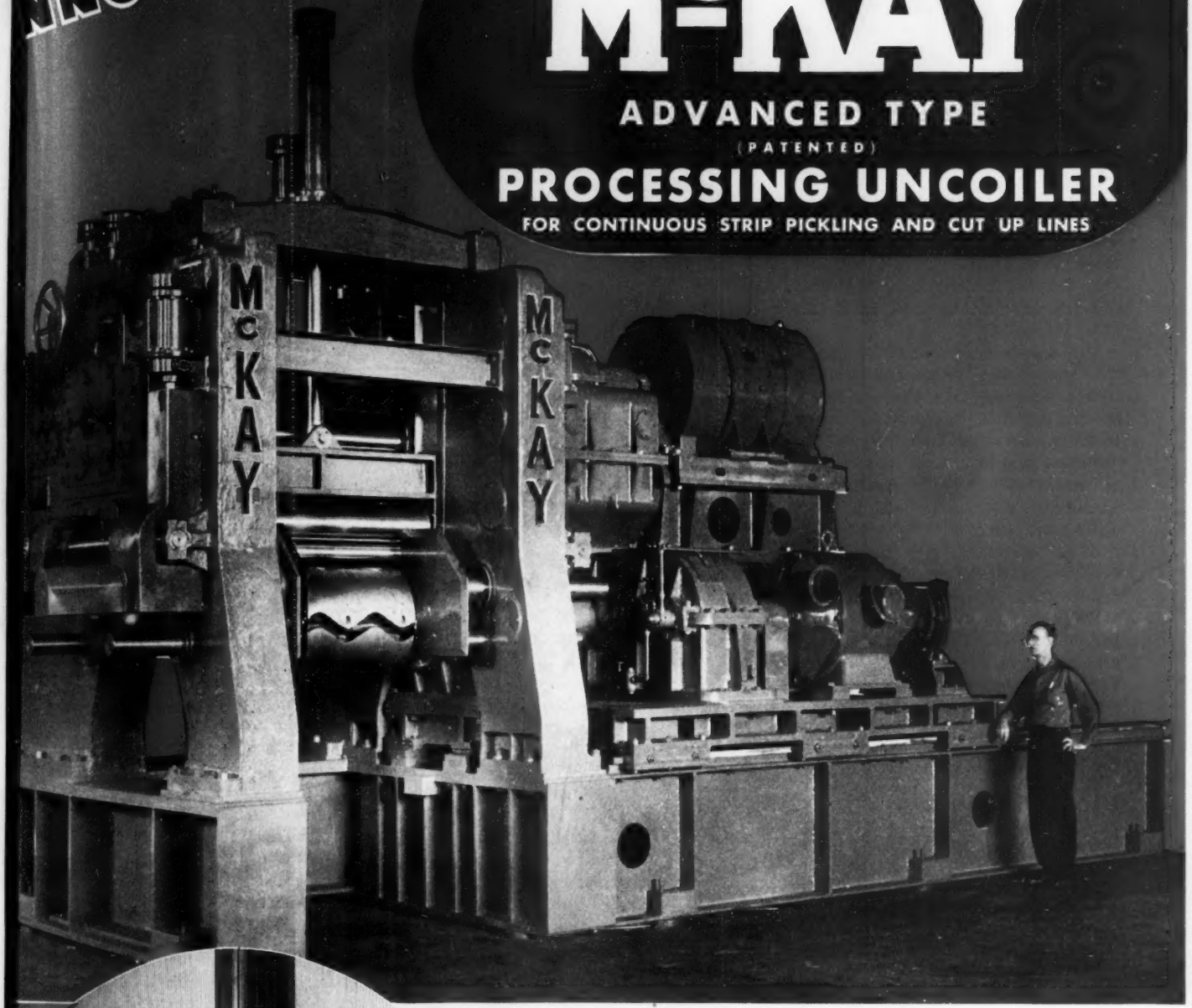

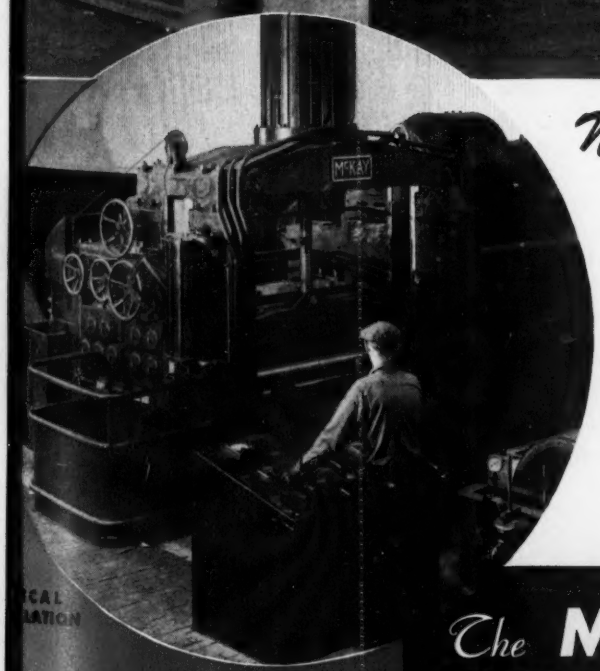

New Features:

1. Rugged, rolling mill design.
2. New expanding mandrel with variable drag motor — accurately centers coil and provides controlled strip tension.
3. Traveling cradle car, for preparing and loading coils.
4. Additional automatic devices reduce loading time.
5. Two (2) separate, pressure regulated, processing roll units, permit better processing and more efficient scale breaking.
6. Larger diameter pulling rolls utilize controlled pressure.
7. Anti-friction bearings used throughout.
8. Full hydraulic operation, with finger tip control.
9. Improved method of lubrication.
10. Compact design — minimizes floor space requirements.

The **McKAY MACHINE** *Company*

ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

YOUNGSTOWN, OHIO

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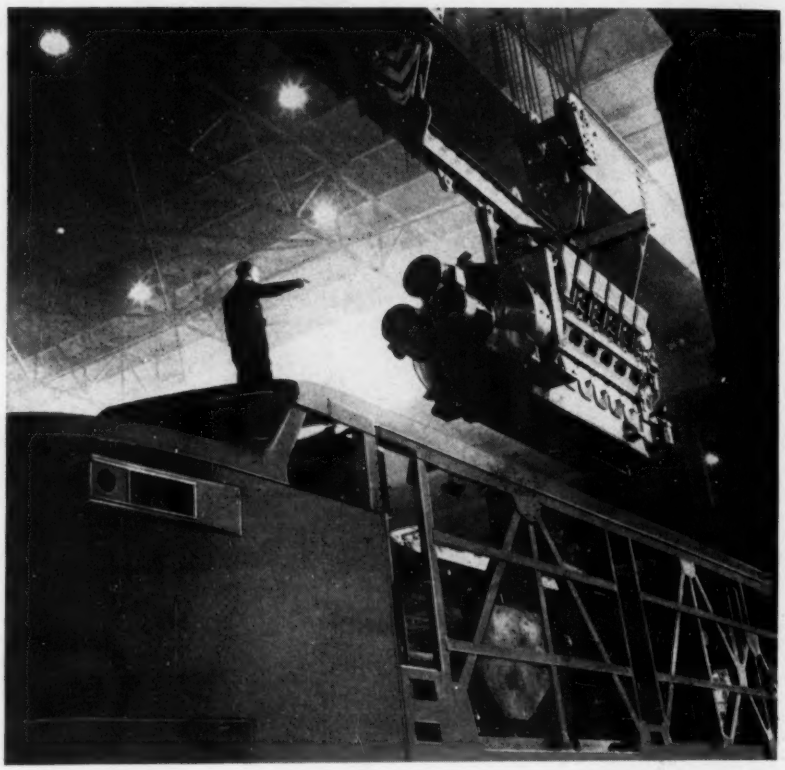
Congress only and that there will be no renewal of the wartime powers under which the President was able to have various government departments and agencies give instructions to the RFC.

Stream Pollution Bill Sought

In a move to get a new stream pollution bill on the statute books before the 80th Congress adjourns, House Public Works Committee has appointed a subcommittee chairmanned by Rep. James C. Auchincloss (Rep., N. J.). It is to study S. 418, the bill passed by the Senate, and the four House bills, H. R. 123, 315, 470 and 3990.

The Senate-approved bill leaves to the states the responsibilities and rights entering into the control of stream pollution, but provides federal technical services and financial aid "to state and interstate agencies and to industries in the formation and execution of their stream pollution abatement programs." Under the Senate bill the Surgeon General (under the direction of the Federal Security Administrator) and the Federal Works Administrator would supervise the carrying out of the federal aid program. Industries would be able to borrow federal funds in amounts up to 33 1/3 per cent of the cost of installing pollution-prevention plants with interest at 2 per cent.



NEW DIESEL-ELECTRIC: Nearing completion is this heavy duty freight locomotive at the American Locomotive Co., Schenectady, N. Y. An overhead crane is lowering a turbo-supercharged 1500-horsepower diesel engine into the locomotive chassis. Ninety-two per cent of the company's locomotive production this year will be diesel-electrics. NEA photo

No Information for Russia

When W. A. Harriman became Secretary of Commerce, the Office of Technical Services ceased servicing Russian orders for copies of its scientific and technical publications on the ground that the supply of such literature maintained by the OTS was only enough to take care of orders from domestic sources. Now the Amtorg Trading Corp., New York, has canceled all these back orders and has asked to have its advance payments returned. Altogether some $8000 is being returned which, considering that the prices on OTS publications usually run from 10 cents up to $1, means that the canceled orders really covered a vast amount of material.

Patent Policy Order Opposed

Most interested government departments are opposed to a Justice Department proposal that the President issue an executive order establishing a uniform government patent policy. It would implement recommendations set forth in Vol. I of the 3-volume report on government patent practices and policies, submitted by the attorney general to President Truman in June of 1947. It would strengthen the government's position in obtaining patent rights to contractors' inventions, and in granting royalty-free, nonexclusive licenses for use of such inventions. Representatives of the procurement agencies, particularly the armed services, say the policy would make it more difficult to place contracts than under the patent policies now pursued by the services.

In view of the fact that the House Small Business Committee is investigating the whole subject of government patent policies, it is believed the President will not sign the order at this time.

Safety Inspections To Increase

Sharp increase in the number of plants and other business establishments inspected for safety and health is due as soon as the necessary inspectors can be trained, according to announcement by William R. McComb, administrator of the Wage & Hour and Public Contracts Divisions, Department of Labor. With funds specially provided by Congress, four safety engineers have been added to direct field inspectors.

In charge of the intensified inspection program is Louis M. Wolford, for six years civilian chief of the safety branch of the Corps of Army Engineers at Boston.

Indicts Electrical Firms

A federal grand jury in Los Angeles has returned an indictment charging 10 corporations with conspiracy to fix prices in the sale of electrical equipment to public utilities in the Pacific Coast area. Department of Justice has also filed a complaint against the same defendants seeking injunction with respect to various pricing practices.

Defendants are: General Electric Co., Schenectady, N. Y.; Westinghouse Electric Corp., Pittsburgh; Delta-Star Electric Co., Chicago; A. B. Chance Co., San Francisco; Cole Electric Co., Culver City, Calif.; Hi-Voltage Equipment Co., Cleveland; Pacific Electric Mfg. Corp., San Francisco; Railway & Industrial Engineering Co., Greenburg, Pa.; Southern States Equipment Corp., Hampton, Ga.; Electrical Engineers Equipment Co., Melrose Park, Ill.

Germans Eye Future Markets

Unprofitableness of production encourages investment of available capital in plant improvement and product development. Steelmakers' operating losses climb

DUSSELDORF, GERMANY

GERMAN manufacturers are spending the largest part of their capital on preparatory work for competition in future markets. General consensus is that production now is almost completely unprofitable, and, except for textile and coal producers, manufacturers are devoting about 80 per cent of all activity to plant additions, renovations, equipment, research and product development in anticipation of an eventual trade resurgence.

Part of this preparatory work was self-imposed on firms which had lost all their patents, technical specifications, etc. to the Allies. Saddled with plants and unable to make their former products, manufacturers have had to redesign their goods from memory, with the result that new models are superior, in some cases, to the old ones.

Sales Volume Dwindles—More important as a factor stimulating product development and increased plant rehabilitation is the current extremely troubled monetary situation. Marketing of goods has reached virtual stagnation, with few firms willing to sell anything for "bad" money at 1936-level ceiling prices. As a result, most of what money is available is poured back into plant modernization, worker training and research, with the little capital left over used for current production.

Lack of raw materials and transportation further exaggerates the trend away from immediate production. In the case of the steel industry, it is estimated that ingot production, using only domestic iron ores, could amount to about 4.2 million tons this year with available coal supplies. Bottleneck in railway transportation, however, would cut this figure to less than 3 million tons. Supply of foreign iron ores, particularly Swedish, could step up output to 4.8 million tons, and as the ore would be shipped by boat much of the transportation difficulty would be overcome. With these factors in mind, negotiations have been started for importation of 1¼ million tons of Swedish ores and a like amount probably will be asked for later.

Industry Losses Mount—Meanwhile, the German steel industry, particularly in the Ruhr, is incurring still heavier operating losses. Deficit of western Germany's steel companies last year was estimated at 200 million marks, against 175 million in 1946. Rising materials costs are expected to increase this loss this year. The coal price is expected to be advanced 10 marks a ton to reduce the amount of coal subsidy payments. This would increase steel production costs by about 16 marks a ton. German iron ore mines, too, are operating in the red and are seeking a 22-mark increase. In addition, trade unions in the Ruhr have demanded elimination of the wage ceilings now in effect.

Higher steel prices seem certain and the Bipartite Economic Control Group, consisting of American and British occupation officials, has submitted to the Allied Control Council in Berlin a proposal raising the steel price 22 marks a ton. Such an advance, experts feel, would be entirely inadequate. Originally it had been figured an increase of 52.60 reichsmarks was needed; the British control office later revised this to 44 reichsmarks, and the latest figure is regarded as insufficient even to cover present increased costs.

Subsidy payments of 50 marks per ton continue to be made for steel produced by the newly established independent companies, and annually amount to about 150 million marks paid out of public funds. The few companies which have not been separated from their original corporate structure are being required to cover operating losses from their own resources, which is leading to a rapid deterioration of the remaining privately controlled firms.

Lack of Exports Serious—Opposition by the British to resumption of German steel exports presents a major stumbling block to increased production. Because in practice only German steel in highly processed form, such as machinery, cutlery, etc., can be exported, German trade is severely limited. This situation is providing an impetus to foreign expansion. Sweden is considering establishing a tube plant, and the Belgian steel industry is undergoing an expansion, with the plants at Duedelingen, Esch-Alzette, Differdingen and Rodingen being modernized, partly in order to take advantage of elimination of Germany from normal trade areas. It looks, therefore, as if the British will not gain as much from the suppression of German competition as will some European countries, with the net effect being wasted capacity for all Europe.

Belgium Ups Iron, Steel Output

LIEGE, BELGIUM

STEPS are being taken to increase Belgian iron and steel output above the postwar record levels of last year's closing months. Three blast furnaces were recently blown in at the works of Ougree-Marihaye, la Providence and Sambre-et-Moselle, to bring the number in blast to 38, the same as were in operation immediately before the war.

Output of pig iron during November was 271,000 metric tons, only 1000 tons less than the postwar record production of the previous month. Output of steel ingots and castings was down to 265,000 tons in November from the October postwar record of 293,000 tons, but was still the second highest production since the war. For the first eleven months of 1947 pig iron production was 2,524,000 metric tons, more than was produced in the entire preceding year. For steel ingots and castings, output for the eleven-month period was 2,595,000 metric tons, also more than was produced in 1946.

Order books continue well filled both for the home market and for export, although the volume of new business coming from abroad is in slight recession. Currently, a number of trade agreements are being renewed, although in some countries, France, for example, the unbalanced state of trade presents certain difficulties. In trade with France, where the volume of exports of Belgian and Luxemburgian goods is greater than imports, the Belgians are uncertain whether to limit exports or advance credits to France. Negotiations are now in progress.

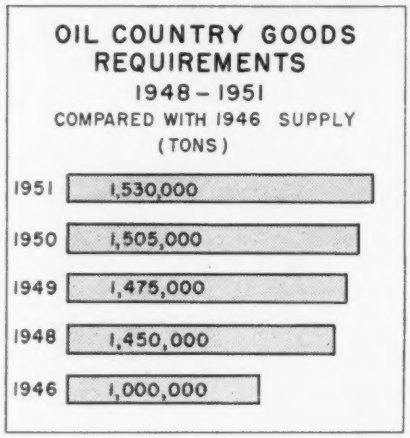
Czechoslovakia

Iron and steel production in Czechoslovakia progressed considerably last year. Average monthly output of pig iron in the first three quarters was 118,000 metric tons, compared to 80,000 tons the previous year. For steel ingots and castings the corresponding figures were 186,000 tons and 139,00 tons.

Need for Oil Country Goods Rises

Requirements in each of next four years are 50 per cent above actual supply in 1946, petroleum association says

Program would help overcome war-created deficiencies in nation's reserves of crude petroleum



REQUIREMENTS of oil country goods (steel casing, tubing and drill pipe) for building the domestic petroleum industry back to a status comparable to that existing at the beginning of the war have been estimated for the next four years by the Independent Petroleum Association of America, Washington.

Those needs for each of the four years would approximate 50 per cent more than the actual 1946 supply of one million tons. Specifically, the requirements and their increases over the 1946 supply are: 1948—1,450,000 tons, 45 per cent; 1949—1,475,000 tons, 47.5 per cent; 1950—1,505,000 tons, 50.5 per cent; and 1951—1,530,000 tons, 53 per cent.

To arrive at the requirements for rebuilding a desired reserve productive capacity, the association, whose members are engaged primarily in the production branch of the petroleum industry, calculated needs of oil country goods that would be required to provide oil for the anticipated increase in petroleum demands without rebuilding the reserve productive capacity needed to meet unusual or emergency demands. To those figures, which the association calls a minimum program, it adds 205,000 tons per year as the needs for overcoming the deficiencies created by the war and to rebuild oil reserves to a normal and safe relationship with production. Minimum domestic requirements (not allowing for rebuilding reserve productive capacity to meet emergencies) are the following tonnages of oil country goods, according to the association: 1948, 1,245,000; 1949, 1,270,000; 1950, 1,300,000; and 1951, 1,325,000.

Reserves Rose Steadily—Production of crude petroleum and the productive capacity, the association points out, depend primarily on the volume of discovered and developed underground reserves. "Over a long period of years prior to World War II the petroleum industry furnished a steadily increasing output and, at the same time, maintained a reserve productive capacity to meet unusual or emergency increases in demand.

"Experience has shown that the minimum necessary trend is one where the additions to proved reserves exceed the current production of crude petroleum. Over the 15-year period (1927-1941) the additions to reserves in the United States totaled 26,553,000,000 bbl, while actual production equaled 15,764,000,000 bbl. In other words, 1.68 bbl were added to reserves for each barrel withdrawn.

"The addition of 1.68 bbl to the discovered and developed reserves in the United States for every barrel produced represents an important relationship that governs the ability of the industry to meet larger demands for petroleum products in future periods," the association points out.

War Cut Reserves — Continuing its analysis, the association says additions to petroleum reserves during the war period (1942-1945) were below the required level by 754 million bbl per year, or a total of 3,016,000,000 bbl for the four war years. "This fundamental condition absorbed the reserve productive capacity existing prior to the war and created the postwar situation of relatively tight supply of crude petroleum," the association asserts. "Additions to reserves were deficient primarily because drilling activity was below normal by 18.5 million feet per year (19.4 per cent) or a total of 74 million feet for the four war years," according to the association. As the association figures each 1000 feet of drilling requires approximately 11 tons of oil country goods, the additional drilling of 18.5 million feet yearly to expand the reserves would require around 205,000 additional tons of oil country goods a year.

Needed Footages Estimated—Total yearly footages of wells that the association calculates should be drilled to provide for current needs plus rebuilding reserves to a normal relationship with production are (in millions of feet): 1948, 131.6; 1949, 134.0; 1950, 136.5; and 1951, 138.9. Actual drilling in 1946 totaled 101 million feet, and the preliminary total for 1947 is 108 million. The association points out that none of the deficiencies in drilling and in additions to reserves created by the war were made up in 1946 and 1947.

Considering that 11 tons of steel are required for every thousand feet of drilling, 2,299,000 tons of oil country goods were needed in 1946 and 1947 for drilling of 209 million feet, the association points out. "The actual supply of oil country goods was approximately a million tons in 1946, with comparable data for 1947 not yet available," according to the association. "The drilling of this footage in 1946 and 1947 was possible only through extensive use of second hand materials to supplement new steel supplies. This practice, involving the premature abandonment of producing oil wells for recovery of materials, is unsound and cannot be expected to continue to furnish materials requirements," the association declares.

Why Line Pipe Demand Is Big

WHY mill production of line pipe is booked for the next several years can be easily understood from the following list of major lines planned for construction in the period of 1947 to 1951. Heretofore, pipe lines have not been planned for installation so far in the future, but now inability to obtain immediately the vast tonnage of pipe necessitates a wait. Most lines planned for 1951 would be commenced within a few months if pipe and equipment were immediately available. In addition to the following list of planned projects there are under construction many hundreds of miles of lines which are absorbing the mills' current production of line pipe.

CRUDE OIL LINES

Miles	Inch	Location	Company
289	12	Goldsmith, Tex.—Borger, Tex.	Standish Pipe Line Co.
197	12-16	Loops, Casper, Wyo.—Freeman, Mo.	Stanolind Pipe Line Co.

130	8	Wamsutter, Wyo.—Casper, Wyo.	Stanolind Pipe Line Co.
70	12	Lysite, Wyo.—Casper, Wyo., looping	Stanolind Pipe Line Co.
50	8	Post pool—Petersburg, Tex.	Stanolind Pipe Line Co.
80	16	Wheeler, Tex.—Wasson, Tex., extension	Stanolind Pipe Line Co.
265	16	Slaughter, Tex.—Drumright, Okla., looping	Stanolind Pipe Line Co.
600	8	Permian basin—Phoenix, Ariz.	Phoenix Pipe Line Co.
600	..	Permian basin—Oklahoma—Kansas	Midway Pipe Line Co.
60	16	West Columbia, Tex.—Houston, Tex.	Texas Pipe Line Co.
80	22	Houston, Tex.—Port Neches, Tex.—Port Arthur, Tex.	Texas Pipe Line Co.
500	20-22-24	Jal, N. Mex.—Cushing, Okla.	Texas Pipe Line Co., Shell Pipe Line Corp., Empire Pipe Line Co., Sinclair Refining Co.
1,045	20	Midland, Tex.—Wilmington, Calif.	Shell Pipe Line Corp. and other companies
300	20	Portland, Me.—Montreal, Que.	Portland Pipe Line Co.
500	20-16	Cushing, Okla.—Wood River, Ill.—Salem, Ill.	Shell Pipe Line Corp. and Texas Pipe Line Co.

PETROLEUM PRODUCTS LINES

Miles	Inch	Location	Company
172	10	Hearne, Dallas, Ft. Worth, Tex., area	Texas Pipe Line Co.
850	10	Houston, Ft. Worth, Dallas, Tex., Coffeyville, Kans., Kansas City	Sinclair Refining Co.
200	8	Kansas City—St. Louis	Sinclair Refining Co.
40	8	New Haven, Conn.—Hartford, Conn.	Connecticut Pipe Line Corp.
127	4-6	Portland, Me.—Bangor, Me.	Socony-Vacuum Oil Co. Inc.

NATURAL GAS LINES

Miles	Inch	Location	Company
1,069	22-26	Hansford, Tex.—Big Rapids, Mich.	Michigan-Wisconsin Pipe Line Co.
101	8-16	Cheyenne, Wyo.—Denver	Colorado-Wyoming Gas Co.
71	20	Beaver and Green counties, Pa.	United Natural Gas Co. (Pa.)
83	20	Carthage, Tenn.—Natchitoches, Tenn.	Tennessee Gas Transmission Co.
438	26	Permian basin—Blythe, Calif.	El Paso Natural Gas Co.
470	26	San Juan basin—Needles, Calif.	El Paso Natural Gas Co.
155	12-16	Pennsylvania	New York State Natural Gas Co.
400	26	Liberal, Kans.—Kansas City	Mid-Continent Gas Trans. Co.
438	22	Kansas City—St. Paul	Mid-Continent Gas Trans. Co.
138	20-22	Chattanooga, Tenn.—Lexington, Miss.	Southern Natural Gas Co.
248	24	Eunice, N. Mex.—Dumas, Tex.	El Paso Natural Gas Co.
84	20	Monroe and Stark counties, O.	East Ohio Gas Co.
1,000	24	East Texas—Pittsburgh	Memphis Natural Gas Co.
268	24	Cobb, W. Va.—Rockville, Ind.	Atlantic Seaboard & Virginia Gas & Trans.
100	20	Ceredo, W. Va.—Crawford, O.	United Gas Fuel Co.
133	16-24	Loops	Northern Natural Gas Co.
320	26	Palmyra, Neb.—Garden City, Kans., looping	Northern Natural Gas Co.
245	24	Palmyra, Neb.—Farmington, Minn., looping	Northern Natural Gas Co.
885	30	Wharton county, Tex.—Keokuk, Iowa	Trunkline Gas Supply Co.
93	18	Baxterville, Miss.—Mobile, Ala.	United Gas Pipe Line Co.
33	20	Carthage, Tex.—Longview, Tex.	United Gas Pipe Line Co.
1,530	..	Alabama, Florida, Georgia, South Carolina	Atlantic Gulf Gas Co.
660	..	Loop	Panhandle Eastern Pipe Line Co.
405	26	Hugoton, Kans.—Kansas City	Cities Service Gas Co.

Proposes Synthetic Oil Plant Program

VAST synthetic fuels industry last week advocated before Congress by Interior Secretary J. A. Krug would require use of 16 million tons of steel and expenditure of about $9 billion.

Mr. Krug said he would this year "develop specific proposals to initiate a synthetic fuels industry in the United States . . . to be started in peacetime without waiting for a national emergency." He added the program should be completed in five to 10 years and result in production of 2 million barrels of synthetic fuel a day, or equivalent to 40 per cent of current U. S. natural oil output.

Contained in Annual Report—These recommendations were contained in the interior secretary's annual report to Congress on progress of the Bureau of Mines' synthetic liquid fuels and development program. He declared the new industry should be built by private capital with government assistance, particularly in regard to technical matters. He also advocated construction of at least three synthetic fuels plants—one using oil shale and the others using coal and different extraction processes—as models if this country is to attain maximum progress toward self-sufficiency in oil.

Further details concerning the tremendous plants necessary for the program will be forthcoming sometime this year, Mr. Krug stated. Thus far, progress has been chiefly in the research and development stage with relatively little need for extensive plant equipment and buildings. The estimate of 16 million tons of steel required for this expansion is based partly on the experience with the synthetic rubber program which is only one tenth the size of this latest project.

Personnel Training Vital — One problem, emphasized Mr. Krug, is the training of men for mining, plant operation and all other functions of this large industry. Engineering difficulties must also be surmounted. The matter of materials shortages, particularly in steel, was only briefly touched upon in the report. Establishment of an American synthetic liquid fuels industry is absolutely necessary, the secretary declared, adding that required materials and manpower must be obtained so that the program can be completed.

Sees No Need To Limit Use Of Petroleum

WHILE the petroleum stringency will continue for a period ahead, there is no need to encourage a limitation of petroleum consumption in the United States—at least from the long-range view. Such is the gist of a report by Secretary of Defense Forrestal to the House Armed Services Committee.

To meet military, industrial and individual living needs, he said, "we must adopt an active policy of favoring sizable importations of oil." In line with this thinking, he said, the National Military Establishment proposes to continue to obtain petroleum products on a "substantial" scale from sources outside the United States.

"It is not anticipated that any new source will soon replace petroleum for military motive power," said Secretary Forrestal.

"Indeed, rather than writing down the military value of oil, our future strategic needs of oil must be calculated on the basis of a greater rate of oil consumption than we had during the last war—when our peak consumption of oil for military purposes was 1,375,000 barrels a day. Maximum military requirements of petroleum in the event of a war emergency are now estimated nearly to double the requirements of World War II."

Civilian Requirements Up — Further, he said, essential civilian requirements of oil are anticipated to be appreciably higher than during the last war. It now appears that United States military and civilian needs for a major war effort would exceed by at least 2 million barrels a day the foreseeable production from the continental United States. So important is the whole matter to the armed services that the Armed Services Petroleum Board has been organized to coordinate all policies in the field of petroleum, while purchases for the three services will be handled by one agency, the Armed Services Petroleum Purchasing Agency.

Latest estimate of the National Defense Establishment as to proved crude reserves in the United States is 21 billion barrels plus, or about 31 per cent of the proven reserves of the world. National security demands that our domestic reserves be kept at an adequate level so as to prevent threats to interruption of shipments from abroad in case of war.

MODEL 30H MAN-AU-TROL HORIZONTAL LATHE PRODUCES 3 IDENTICAL PIECES IN LESS TIME THAN NORMALLY REQUIRED FOR ONE

Meeting demand for lower production costs on between-center shaft turning work which calls for turning, grooving, facing and angle-turning, this new BULLARD Man-Au-Trol machine offers advantages never before found in horizontal lathes.

3 Identically-Tooled Spindles Cut Unit Costs

Turning out three finished pieces per cycle . . . with simplified tooling for rough and finish cuts, with Man-Au-Trol keeping tools cutting almost continuously . . . the BULLARD Model 30H Lathe not only outproduces three ordinary horizontal lathes but also reduces tooling costs.

Makes the Operator's Job Easier

The BULLARD Man-Au-Trol Horizontal Lathe has headstock and all operating controls conveniently located at the operator's right. Each of the three hydraulically-operated chucks is controlled by a foot treadle . . . leaving the operator's both hands free. Work and tools are always visible and easily accessible to the operator without reaching across tools or tool slide.

An Automatic All-Purpose Machine

Man-Au-Trol, *the automatic control that is as versatile as manual control*, makes this highly productive lathe an all-purpose machine. Quickly and easily changed over from one job to an endless variety of other jobs and convertible from automatic to manual operation at the turn of a single lever, it is practical for long or short runs.

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The unique combination of productivity, convenience, versatility and accuracy makes the new BULLARD Model 30H Man-Au-Trol Horizontal Lathe worth investigating. Complete specifications will be sent on request.

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MAN-AU-TROL
MASTER OF THE MACHINE
HORIZONTAL LATHE
Model 30H

BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Olds Futuramic is General Motors' first completely new postwar design. Follows trend set by independents. Features lower body, better vision, curved windshield

DETROIT

FIRST completely new postwar body to appear on any General Motors model—the largest or so-called "C" body series—was unveiled here last week in the version to be featured by Oldsmobile 98 Futuramic designs. In many respects it follows the trend developing in other postwar cars, in that sheet metal below the belt molding has been "blown out" into the pontoon shape, as designers have dubbed it. Rear fenders, however, as on the Studebaker, have been retained, except that they are considerably thinner and are finned up at the rear and tail-lights spotted in the fins. Incidentally, these sharply drawn fenders caused a lot of trouble and steel breakage in early press operations.

Full specifications of the new series will not be announced until Feb. 15, but a casual examination reveals many of the detail changes. The lower line of windows and windshield has been dropped a couple inches for improved vision. Much more glass area is provided both in windshield and rear window, the former being curved for the first time in any GM design.

Curved windshields presented an interesting problem in adapting the wiper blade to traverse the more or less compound curved surface and to make full contact over the area swept. It was solved by making the backing of the rubber blade flexible, with molded metal inserts resembling those of a zipper closure. The blade is held to the arm at two points, giving sufficient flexibility to maintain contact.

Bodies Lower — Overall height of the Olds 98 body, which will be used also by Cadillac on its forthcoming models, is lower by several inches, further complicating the problem of tall persons in entering and exiting without damage to skull or headgear. This difficulty, along with a minimum of headroom inside, is the source of mounting complaints heard in connection with many of the newer body designs. It is something which apparently is being ignored by stylists who apparently concern themselves with average individuals only, and leave six-footers to their own devices. Perhaps there is nothing to be done about it, if the end result in a design must be a hug-the-road creation. Compromises, however, can be carried too far. The Olds also sacrifices some interior legroom by shortening up the wheelbase on the 98 model to make it the same as the 60 and 70 series, which are unchanged from 1947 except for minor embellishments.

More Power — Horsepower of the 8-cylinder engine powering the 98 has been raised from 110 to 115 by planing off the cylinder head a little more to raise compression ratio. Instrument panel is severely plain and the instrument cluster is slightly hooded, reminiscent of an Olds innovation introduced some years before the war. Many buyers doubtless will welcome the simplification of the instrument panel and the removal of the broad expanses of bright metal fitted on so many dashboards.

Prices are unchanged on the face-lifted Olds models for 1948, are up 1-2 per cent on the deluxe and Futuramic series. This follows the pattern set by Buick, Pontiac and Chevrolet which have continued price schedules in the face of higher costs right down the line. If the UAW-CIO should be successful in pressuring a wage increase in April from GM, it is practically a foregone conclusion all prices will be boosted accordingly. Currently the UAW appears to be crystallizing its demands to cover a 15-cent hourly increase, plus 10 cents an hour additional to cover a pension plan, plus 5 cents more for a health insurance fund, plus another 1 cent for extended vacation allowances.

One of the Roosevelt boys conferred with Walter Reuther, union president, the other day, presumably dickering for a chunk of the insurance policy the UAW would place should it win demands for the 5 cents to cover such an underwriting, the policy of course to be handled by the company with which the Roosevelts are associated.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1947	1946
January	366,205	109,910
February	393,636	101,637
March	443,588	134,071
April	445,137	229,867
May	404,191	263,445
June	421,466	217,943
July	400,944	315,963
August	364,478	358,457
September	444,501	339,774
October	461,536	406,561
November	419,342	389,645
December	488,114*	393,223
12 mos.	5,053,138*	3,260,496

* Preliminary.

Estimates for week ended:

	1948	1947
Jan. 10	111,278	64,828
Jan. 17	109,031	75,166
Jan. 24	109,865	93,278
Jan. 31	95,000	94,114

Estimates by Ward's Automotive Reports

Open Co-Op Store

Meanwhile the UAW is pursuing its experiment of opening co-operative retail grocery and appliance stores, the latest being in Pontiac where, during the first 18 hours the store was opened for business, 917 families spent $5510 for supplies, in addition to investing $1150 in share capital. Total invested capital in the store now is well over $16,000 and shareholders number over 1200.

The Pontiac co-operative is the pilot project of a plan developed last summer after several UAW locals started selling groceries in their union halls. Several more such projects are under way in Detroit, Flint, Jackson and Muskegon, Mich., and CIO rubber workers are adopting the plan in Akron, O.

Chevrolets Little Changed

Chevrolet passenger car models for 1948 carry few outward changes beyond a slightly redesigned radiator grille featuring a new T-shaped center section. Crease moldings, below windows at the side, are wider than those on 1947 models. Window moldings have been altered slightly. Engine changes include a more rigid crankshaft, with greater crank-arm thickness. Main bearings are interchangeable, of the thin-wall babbitt type, estimated to have double the life of old-style bearings. Connecting

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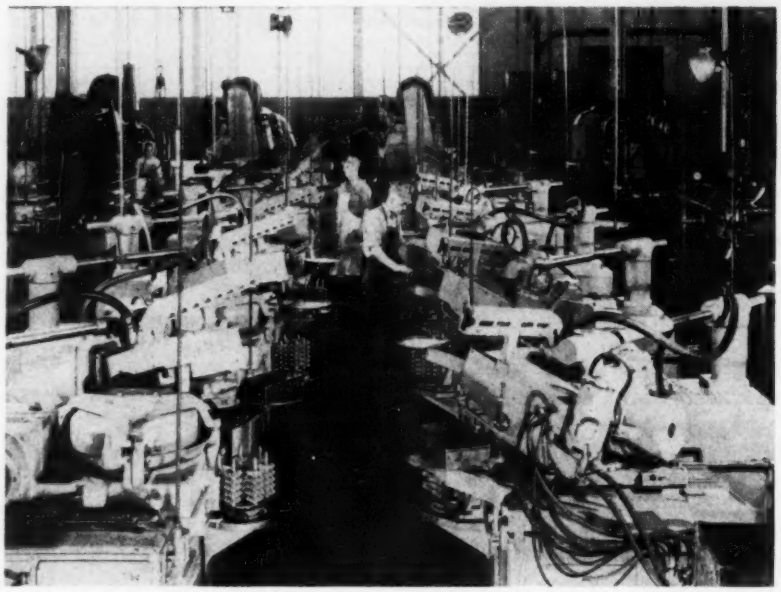

SPEEDS GM OUTPUT: Battery of gear cutters in a new axle plant of Pontiac Motor Division, Pontiac, Mich., which now has capacity for producing 175 differentials per hour for Pontiac and other General Motors divisions

rods bearings are similar. Oil seal on valve stems is in the form of a buna rubber ring, eliminating the need for valve spring cap covers and improving low-speed oiling of stems. Ignition switch has been redesigned to a three-position type, permitting the car to be driven with the key removed. Pressure-type radiator cap permits the cooling system to build up light pressure, raising water boiling point about 10 degrees, and a new muffler tail-pipe projects further to the rear to carry exhaust gases into the rear wheel windstream and prevent discoloration of the bumper—also making it more vulnerable to crumpling from rear-end impacts.

Willys To Use 6-Cylinders

Six-cylinder L-head engine developed by the engineering staff of Willys-Overland is the foundation around which the company's projected light-weight passenger sedan ultimately will be built. It develops 70 horsepower at 4000 rpm, has 6.5 to 1 compression ratio, with 3-inch bore and 3½-inch stroke. Cylinders are cast enbloc, integral with upper crankcase, and have full-length water jacket. Four main bearings are steel-backed and babbitt-lined. Crankshaft is drop forged and heat treated carbon steel, as are I-beam section connecting rods.

Pistons are cast aluminum, brass plated. Intake manifold is the downdraft three-port type, located on the left, while the exhaust manifold is a four-port external unit with thermostatically controlled deflecting valve to provide automatic regulation for preheating intake gases. In the valve mechanism, mushroom-type tappets are of two-piece steel construction and all valves operate in removable cast iron guides. Engine has stripped weight of 356 pounds, rather light for conventional engines of this rating.

Turnover Rate Declines

Average monthly turnover rate of hourly personnel at the Rouge plant of Ford Motor Co. declined 37 per cent in 1947, reflecting in part at least improved labor relations prevailing there. Monthly labor turnover, based on all classifications of separations, was 2.2 per cent compared with 3.5 per cent in 1946 and contrasting with a rate of 4.5 per cent for the entire automotive industry based on data available through last August. Rate for all manufacturing industry in this period was 5 per cent.

Emphasis being placed on promotion of present employees and more personalized methods of receiving, interviewing and selecting job applicants, as well as interviewing all separations before they leave the company, have all played a part in reducing turnover.

Improvements in the company's relations with salaried personnel also are deduced from the results of a tabulation of confidential answers of more than 3000 to a scientifically prepared questionnaire.

Production Holds High

Car and truck production has been holding fairly close to the 22,000-per-day figure so far this year, and on the basis of 255 working days the indicated annual total would figure to better than 5,600,000 or about in line with the industry's earlier productions. Thus, if a weather eye is kept peeled on daily output figures to catch variations from the 22,000 norm it is possible to keep up to date on whether assemblies are in line with the year's goal. Untoward events like the shutdown of 40 plants in the Detroit area over the past 10 days, idling an estimated 200,000 as the result of a critical shortage of industrial gas incident to the coldest stretch of weather the city has experienced in 12 years, are crippling blows. Chrysler Divisions, Briggs, Packard, Chevrolet Gear, Axle and Forge plants, and scores of parts suppliers bore the brunt, and unless some moderation in the temperature arrives, further declines in output will result this week.

Recent labor disturbances like the walkout of Hudson foremen for a short period and the possibility of a strike vote at Murray Corp.—requested of state labor mediation officials, by Hudson management, to settle unrest over disciplinary action against wildcat strikers—have had or will have effects on assemblies.

Actually, to realize the projected total for 1948, the daily rate will need to be moved up closer to 25,000, because of the impending shutdowns of Ford lines for model changeovers, and further likely changeovers late this year. Some talk is heard locally of a possible 60-day interruption to get the new Ford car rolling.

Steel Supply Easing?

Straws in the winter wind point to an easing of the steel supply problem. A large mill, for example, has scheduled a moderate sheet tonnage for shipment to Kaiser-Frazer next month, after steadily being unable to furnish flat-rolled to the Willow Run producer. Added sheet rolling capacity is now installed and operating in the Great Lakes Steel plant here, and ingot production would be stepped up at once if sufficient pig iron were in sight. No start has been made as yet on bessemer blowing of pig iron for open-hearth hot metal because of the inability to get blast furnace production in step with the higher demands. It should be coming along soon, however.

New Ozalid Streamliners Now Available For Immediate Delivery

Now, you can order—and promptly receive—a new, moderately priced print-making unit that gives you these 5 new advantages at no extra cost:

1. **SPEED.** In 25 seconds an Ozalid Streamliner reproduces your engineering drawings . . . or anything typed, drawn, printed or photographed on *translucent* paper.

2. **EFFICIENCY.** You always get an exact-size positive (not negative) copy direct from your original . . . produced in 2 quick steps—Exposure and Dry Development.

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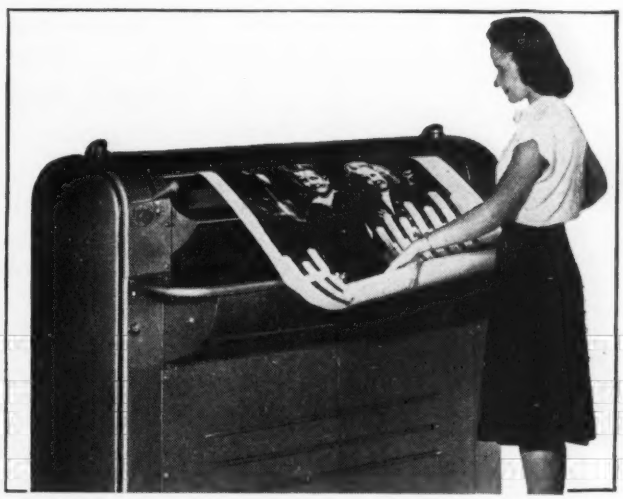
Now an easy desk job. You remain seated, relaxed. All controls within easy reach. Prints are delivered on top, completely dry. Another advantage: You can install your Streamliner in any drafting room or office. Only 6 square feet of floor space is required.



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Expanded Production Facilities Now Permit Immediate Delivery

Thousands of Streamliners already installed. The following list is a typical cross-section of users:

Armstrong Cork Company
Bethlehem Steel Corp.
Bloomingdale Brothers
Bulova Watch Company
Chris Craft Corporation
Chrysler Corp.
Columbia Broadcasting System
Dun & Bradstreet
E. I. DuPont
General Electric Co.
General Motors Corp.
International Harvester Co.
Lever Brothers
Montgomery Ward Co.
New York Central Railroad
Northern Pacific Railway Co.
Pan American Airways, Inc.
Paramount Pictures, Inc.
Parke, Davis & Co.
Pittsburgh Plate Glass Co.
Remington Rand
Scovill Manufacturing Co.
E. R. Squibb & Son
Standard Oil Co.
Swift & Co.
Westinghouse Electric Co.

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DEPT. NO. 28

OZALID Division of General Aniline & Film Corporation, Johnson City, New York

Gentlemen: Please send free, 24-page, illustrated booklet . . . showing all of Streamliner's uses and 10 types of Ozalid prints.

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Position_____

Company_____

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Ozalid in Canada—Hughes Owens Co., Ltd., Montreal

Baltimore Area Expansion Ups Steel Demand

BALTIMORE

STEEL trade in this district continues to be marked by an excess of demand over supply in most products. Only in stainless steel, alloys, cold-drawn bars and certain wire specialties, such as wire rope, does there appear to be any semblance of balance.

This is likely to remain so, despite expanding production facilities in the immediate vicinity. The major development is that of Bethlehem Steel Co. at Sparrows Point, Md., but delays, particularly in the delivery of electrical equipment, have hampered completion of the program. At present, however, certain leading units, notably the hot sheet mill, are virtually completed with trial operations in progress. Even here, nevertheless, full-scale production is not expected until the second quarter because of raw materials shortages.

Relief Expected—The situation will be improved, probably early in April, when the new 1800-ton blast furnace at Sparrows Point goes into blast. Flow of scrap should also improve with milder weather, and the Bethlehem ship breaking yard in this district is steadily boosting its output. Last month production reached a new high of 15,000 tons.

An increasing amount of scrap is coming into this yard from abroad, two cargoes having been received, one from the Philippines and the other from Hawaii. These cargoes are unconnected with the recent purchase of 1 million tons of unprepared scrap from the Chinese government.

Rustless Iron & Steel Division of American Rolling Mills Co. also expects to turn out more scrap, and during the past year spent $250,000 in expanding its scrap yard.

Record Peacetime Year—Last year was one of the three best peacetime years in regard to expansion in the history of the Baltimore area. More than 50 new industries came into the district, and there were 115 expansions of existing industries.

Among the metalworking companies new in manufacture to Baltimore last year were American Steel Products Corp., maker of lockers, shelving and cabinets; American Metal Products Corp., producer of magnesium products; Ceco Steel Products Corp., manufacturer of reinforcing steel and wire mesh; Milcor Steel Co., fabricator of components used in construction of metal buildings; Dykman Mfg. Co., maker of flexible gear type couplings; Ajax Alloy Foundry Inc.; Signode Steel Strapping Co.; and Carton Machinery Inc.

MILLIONTH MOTOR: The 1,000,000th electric motor produced by Jack & Heintz Precision Industries Inc., Cleveland, is presented by Reber C. Stupp, second from right, vice president in charge of production, to Edward R. Legg, sales vice president, as Frank Kohnstamm, left, general sales manager, Harold Melampy, center, superintendent, and Robert J. Ginn, right, general superintendent of production, look on

Among local companies erecting new plants were Clogg Co., fabricating firm; W. J. Dahle & Son, producer of nonferrous castings; United American Metals Corp., manufacturer of babbitt metal; Derby Steel Co.; and Abco Machine Co. Inc.

Enlarge Facilities — Those enlarging existing facilities included Balmar Corp. which expanded to make equipment for pre-fabricated housing; Harry C. Weiskittel Co., manufacturer of gas ranges; Murray Corp. which makes hose clamps and similar items; Southern Galvanizing Co.; Stainless Fabricators Inc.; and Eastern Iron & Steel Co.

The Eastern Venetian Blind Co. recently acquired a 200,000-sq-ft building from WAA. During the past year Maryland Car Wheel Co. completed an expansion program, and Black & Decker Mfg. Co. began a 16,000-sq-ft warehouse addition. Comfort Spring Corp. built a new plant to draw wire, and Reynolds Spring Co. began production of automobile seat springs. Wire Belt Co. of America equipped space for woven wire belts, and Better Built Spring Co. expanded for production of upholstered furniture springs and other items.

Other important developments included construction of a 100,000-sq-ft laboratory by General Refractories Co., and there were important expansions in the chemical and electrical industries. Consolidated Gas, Electric Light & Power Co. pushed construction throughout the year on its $50 million expansion program.

Structural Demand Brisk — Structural steel demand involves several bridge projects, including a 6000-ton project in the District of Columbia on which Bethlehem Steel Co. is low, and a 5000-ton project in Chesapeake City, Md., on which the American Bridge Co. is low. Arundel Corp., this city, with associates, is low on the United States Engineer's dam near Buffalo, involving 1500 tons.

Incentive Plan Boosts Output 47.7 Per Cent

Hi-Shear Rivet Tool Co., Hermosa Beach, Calif., reports a production increase of 47.7 per cent since last Nov. 1 as the result of a new plant-wide wage incentive plan. The boost in output has been accompanied by a bonus to employees amounting to 18.2 per cent of their gross earnings.

The firm reports that for about a year previously it had experienced a slow-down in production despite the fact that its labor relations were excellent.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Bureau of Mines, Department of the Interior, has published reports on tests for fluorite, manganese, iron and molybdenum. Fluorite and manganese deposits were explored in various western states. Iron was found in Wisconsin and molybdenum in North Carolina.

—o—

Carnegie Institute of Technology, Pittsburgh, has broken ground for its new synchrocyclotron on the site of the former KDKA transmitting station at Saxonburg, Pa.

—o—

Ozark-Mahoning Co. has purchased for $670,000 the government sulphuric acid plant at Tulsa, Okla. Facility has total capacity of 320 tons of sulphuric acid per day.

—o—

Daunt Corp., Brooklyn, N. Y., has purchased for $200,000 a government-owned engine parts plant in Trenton, N. J. The plant was operated during the war by Turbo Engineering Corp. Daunt will use the facility to manufacture light standards.

—o—

Twin Coach Co., Kent, O., delivered 2211 motor coaches in 1947, largest production year in the firm's history.

—o—

Bendix Home Appliances Inc., South Bend, Ind., exported $5 million worth of automatic washers in 1947. Approximately half the shipments went to Argentina, Mexico and Canada. Belgium and Switzerland also received a substantial portion of the export volume.

—o—

General Metals Corp., Oakland, Calif., producer of drop forgings and electric steel castings, has opened a sales office at 65 Madison St., Seattle, with Roy C. Hoag in charge.

—o—

R. G. LeTourneau Inc., Peoria, Ill., manufacturer of earth-moving equipment, has formed a wire rope sales department as part of its sales division. W. H. Wilson will be wire rope sales manager. LeTourneau began manufacturing this product in 1941.

—o—

General Electric Co., Schenectady, N. Y., plans to expand production of plutonium at its Hanford, Wash., plant. Plutonium is a nuclear fuel used as a fissionable material for military purposes and in research.

—o—

Carboloy Co. Inc., Detroit, manufacturer of cutting tools, has appointed Theo. C. Ulmer Inc., Philadelphia, as its distributor in southeastern Pennsylvania, southern New Jersey and northern Delaware.

—o—

Cochrane Corp., Philadelphia, manufacturer of water conditioning and steam handling equipment, is this year celebrating its 85th anniversary in the power plant equipment field.

—o—

Todd Shipyards Corp., New York, will sell its Tebo shipyard in Brooklyn, N. Y. Equipment at the facility will be auctioned off Mar. 2 and includes lathes, boring mills, radial drills, drill presses, millers, shapers, planers, band saws and grinders.

—o—

Watson-Stillman Co., Roselle, N. J., manufacturer of hydraulic machinery, has named H. M. Royal Inc., Los Angeles, as its sales agent in southern California for plastics and rubber molding equipment. Schellenbach Machine & Tool Co., San Francisco, has been appointed a sales agent in northern California for hydraulic machinery.

—o—

McCormick Steel Co., Houston, Tex., steel warehousing firm, will occupy a new $200,000 building at 1110 Lockwood Dr. on Mar. 1. Firm is a successor to H. W. McCormick Co.

—o—

Motor Products Mfg. Co., maker of universal joints for automobiles and trucks, has moved to 711 S. Redondo Blvd., Inglewood, Calif.

—o—

Association of American Railroads, Washington, reports the nation's railroads transported more than 520 million tons of coal in 1947, or about one million tons more than in the previous record year of 1926.

—o—

Industrial Equipment Co., with offices in Buffalo, Rochester and Syracuse, N. Y., has changed its name to Tri-Line Corp. Firm is a manufacturers' sales agent.

—o—

American Standards Association, New York, in co-operation with the American Society of Refrigerating Engineers, has appointed a committee to revise the 1939 American Standard Safety Code for Mechanical Refrigeration.

—o—

Corey Steel Co, Cicero, Ill., has been purchased by a group headed by Henry W. Angsten, new chairman of the board; Earl W. Whiteway, president; and Paul J. Darling, vice president in charge of sales.

—o—

Chicago Pneumatic Tool Co., New York, manufacturer of portable power tools, will build a plant near Utica, N. Y. The facility, to contain approximately 500,000 sq ft of floor area, will be started in April, with completion scheduled for March, 1949.

—o—

Los Angeles Chamber of Commerce, Los Angeles, reports that manufacturers poured $124,811,500 into construction of new plants and expansion of existing factories in this California area during 1947, making it the third greatest year of industrial development in the city's history.

—o—

Lester-Phoenix Inc., Cleveland, manufacturer of injection molding and die casting machines, has named Thoreson-McCosh, Detroit, as its sales agent in the Detroit area.

—o—

University of Chicago reports that Inland Steel Corp. has joined with eight other firms to help finance the university's $12 million research program in the Institute for Nuclear Studies. Other companies participating are Standard Oil Co. of Indiana, Westinghouse Electric Corp., Pittsburgh Plate Glass Co., Shell Oil Co., Aluminum Co. of America, Sun Oil Co., United States Steel Corp. and Standard Oil Development Co. of New Jersey.

—o—

Reed Roller Bit Co., Houston, Tex., has entered the pneumatic tool industry with formation of Cleco Division for the manufacture and worldwide distribution of rotary and reciprocating pneumatic tools for general industry. W. J. Vossbrinck has been named sales manger of the new unit.

—o—

Gibson Refrigerator Co., Greenville, Mich., has purchased Coolerator Co. for an amount "in excess of $2 million." Acquisition by Gibson, maker of electric refrigerators, ranges and home freezers, will increase production to 2000 refrigerators a day.

—o—

A. Milne & Co., New York, has opened a new tool steel warehouse at 11110 Avon Ave., Cleveland.

—o—

Vickers Inc., Detroit, manufacturer of pumps and other machinery, announces that its affiliate, Selenium Corp. of America, maker of rectifiers and self-generating photoelectric cells, has been dissolved. Firm is succeeded by Vickers Electric Division, Vickers Inc., El Segundo, Calif.

The Business Trend

IN SPITE OF widespread inclement weather during the week ended Jan. 24 and the forced curtailment in use of gas for industrial purposes in some areas, the nation's industrial and commercial activity remained on a relatively high level, some indicators of the level of operations breaking all records. STEEL's industrial production index at 169 per cent (preliminary) of the 1936-1939 weekly average was unchanged from the previous week.

STEEL—New peacetime high of approximately 1,732,200 net tons of steel ingots was produced in the week ended Jan. 24, with the operating rate, based on the industry's 1948 capacity of 1,802,476 net tons, moving to 96.5 per cent.

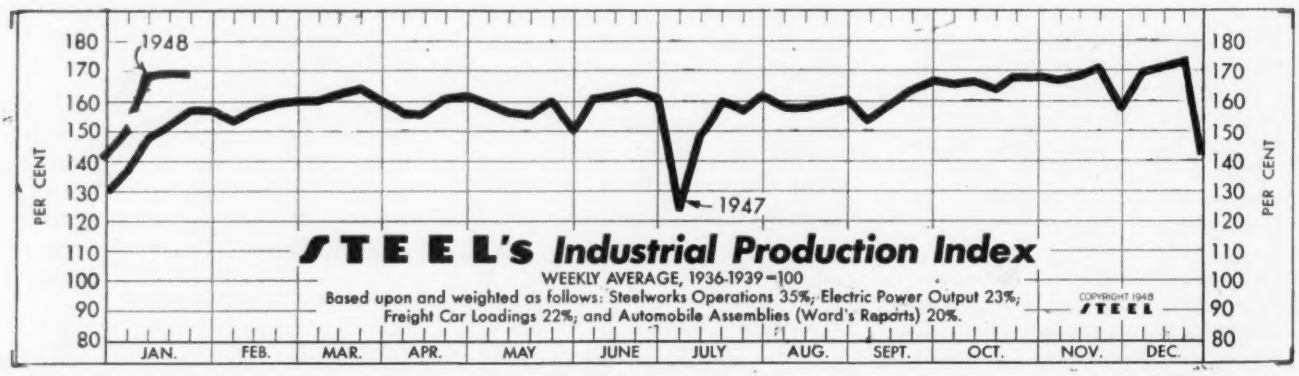
PETROLEUM—Average daily gross crude oil production has risen to new highs in three successive weeks, and American Petroleum Institute reports output in the four-week period ended Jan. 17 was almost 15 per cent greater than in the comparable 1946-47 weeks. Interior Department's Bureau of Mines announces that November daily average production of 16,590,000 gallons of natural gasoline and allied products set a new record.

OIL BURNERS—November factory shipments of oil burners were 12 per cent above those for the like month in 1946, although the 80,857 units shipped was 37 per cent less than the previous month, according to the Bureau of the Census. Order backlogs for these residential, industrial and commercial heating units declined to 304,270 units, a drop of 31 and 69 per cent, respectively, from unfilled orders as of Oct. 31, 1947, and Nov. 30, 1946.

RAILROADS—Operating revenues of Class I railroads increased 24.1 per cent in December over the like 1946 month, Association of American Railroads estimates. The improvement reflects the interim increases of 8.6 per cent in freight rates and of 25 per cent in mail pay rates authorized during the year by the Interstate Commerce Commission.

PRICES—Upward spiral of wholesale prices continued for the eleventh consecutive week and by Jan. 17 reached 165.5 per cent of the 1926 average, Bureau of Labor Statistics reports. The index now is 1.8 per cent higher than a month ago, 17.5 per cent above a year ago and only about 1 per cent below the all-time peak of May, 1920. Preliminary estimates by the bureau indicate a 1 per cent gain in retail prices of goods and services purchased by moderate-income families in large cities between mid-November and mid-December.

HOMEBUILDING—Number of new nonfarm dwelling units on which building was begun slumped 23 per cent in December from the November total, Bureau of Labor Statistics reports. Severe winter weather was held to blame for the 18,000-unit drop to 62,000 new homes. The 854,600 new permanent units under construction in 1947, however, made the year's total the largest since 1925. Completions during the year totaled 834,500, or almost twice as many as were finished in 1946.



The Index (chart above): Week Ended Jan. 24 (preliminary) 169 Previous Week 169 Month Ago 141 Year Ago 157

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	96.5	98.0	86.0	92.0
Electric Power Distributed (million kilowatt hours)	5,436	5,370	4,830	4,856
Bituminous Coal Production (daily av.—1000 tons)	2,170	2,300	2,200	2,212
Petroleum Production (daily av.—1000 bbl.)	5,336	5,326	5,285	4,672
Construction Volume (ENR—Unit $1,000,000)	$118.9	$83.3	$63.6	$73.9
Automobile and Truck Output (Ward's—number units)	109,865	109,031	75,638	93,278

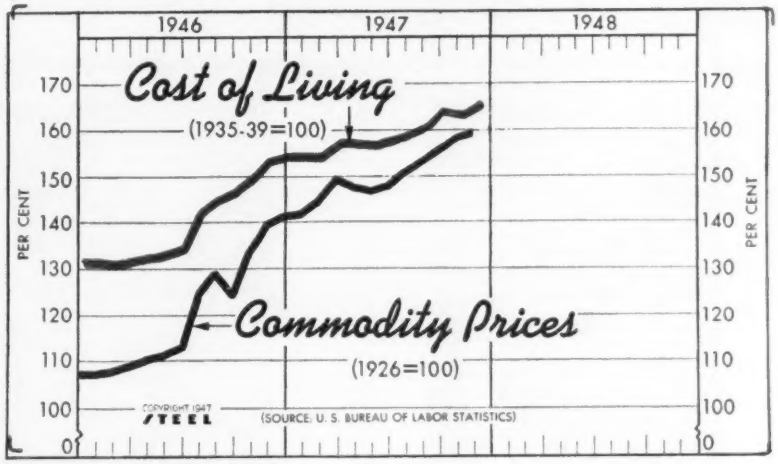
* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons.

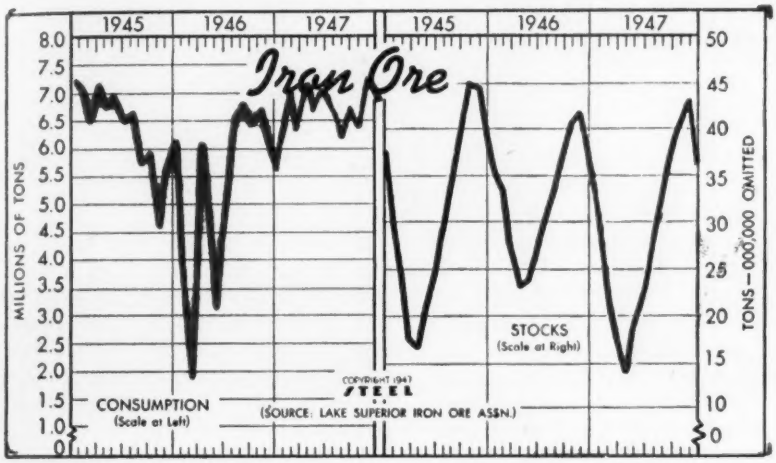
TRADE				
Freight Carloadings (unit—1000 cars)	790†	811	599	822
Business Failures (Dun & Bradstreet, number)	109	61	38	52
Money in Circulation (in millions of dollars)‡	$28,211	$28,374	$29,111	$28,369
Department Store Sales (change from like wk. a yr. ago)‡	+5%	+8%	+8%	+17%

† Preliminary. ‡ Federal Reserve Board.

Wholesale Commodity Price—Cost of Living Indexes

	—Commodities— (1926=100)			—Living Cost— (1935-39=100)		
	1947	1946	1945	1947	1946	1945
Jan.	141.5	107.1	104.9	153.3	129.9	127.1
Feb.	144.5	107.7	105.2	153.2	129.6	126.9
Mar.	149.5	108.9	105.3	156.3	130.2	126.8
Apr.	147.7	110.2	105.7	156.2	131.1	127.1
May	147.1	111.0	106.0	156.0	131.7	128.1
June	148.0	112.9	106.1	157.1	133.3	129.0
July	150.8	124.7	105.9	158.4	141.2	129.4
Aug.	153.6	129.1	105.7	160.3	144.1	129.3
Sept.	157.4	124.0	105.2	163.8	145.9	128.9
Oct.	158.5	134.1	105.9	163.8	148.6	128.9
Nov.	159.5	139.7	106.8	164.9	152.2	129.3
Dec.	....	140.9	107.1	....	153.3	129.9
Ave.	....	120.9	105.8	....	139.3	128.4





Iron Ore

(Lake Superior Iron Ore Assn.)

Gross tons—000 omitted

	Consumption		Stocks at Lake Erie Docks and Furnaces	
	1947	1946	1947	1946
Jan.	7,024	3,719	30,514	35,342
Feb.	6,264	1,748	24,317	33,647
Mar.	6,979	6,021	17,411	27,601
Apr.	6,579	4,769	13,555	23,079
May	6,885	2,990	17,618	23,905
June	6,500	4,995	21,746	26,265
July	6,156	6,460	28,440	30,439
Aug.	6,638	6,738	33,896	34,067
Sept.	6,492	6,380	38,370	37,573
Oct.	7,151	6,625	41,641	40,435
Nov.	7,068	6,131	43,010	41,919
Dec.	6,970	5,516	36,095	37,465
Total	80,807	62,093		

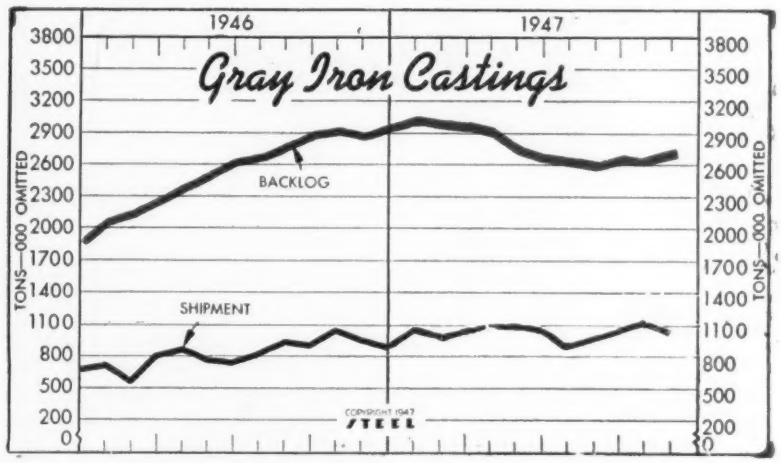
Gray Iron Castings

(U. S. Bureau of Census)

Tons—000 omitted

	Shipments		Backlogs*	
	1947	1946	1947	1946
Jan.	1,078	727	3,021	2,096
Feb.	1,010	572	2,987	2,182
Mar.	1,090	820	2,979	2,285
Apr.	1,097	886	2,908	2,430
May	1,097	783	2,783	2,531
June	1,038	757	2,711	2,640
July	913	840	2,657	2,708
Aug.	952	973	2,631	2,814
Sept.	1,025	937	2,680	2,897
Oct.	1,154	1,078	2,669	2,953
Nov.	1,020	987	2,687	2,940
Dec.	....	909	....	2,980
Mo. Ave.	....	856	....	2,621

* Unfilled orders for sale to the trade.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$14,024	$13,188	$15,666	$13,092
Federal Gross Debt (billions)	$256.6	$256.5	$256.7	$259.7
Bond Volume, NYSE (millions)	$23.8	$32.4	$24.2	$22.2
Stocks Sales, NYSE (thousands)	5,144	4,617	5,336	4,426
Loans and Investments (billions)†	$65.1	$65.1	$65.4	$56.1
United States Gov't Obligations Held (millions)†	$37,587	$37,642	$37,653	$36,231

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$78.41	$78.18	$76.32	$69.36
All Commodities†	165.5	164.5	162.5	140.8
Industrial Raw Materials†	186.0	182.9	183.4	153.3
Manufactured Products†	157.6	157.3	154.4	136.4

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

CHARLES P. COLLINS

GILES R. LOCKE

RICHARD H. DIESEL

Charles P. Collins has resigned as secretary and general counsel of SKF Industries, Philadelphia, to assume the position of president and a director of Norma-Hoffman Bearings Corp., Stamford, Conn.

—o—

Creston E. Kite has resigned as vice president in charge of sales, General Alloys Co., Boston, to become general sales manager of Abarry Steel Co., Perth Amboy, N. J. Prior to his connection with General Alloys Co., Mr. Kite was sales executive for 20 years with E. F. Houghton & Co., Philadelphia. **John P. Scasserra,** manager of Abarry Steel Co. for the past three years, has been appointed general manager.

—o—

Arthur J. Wieland, vice president in charge of distribution, Willys-Overland Motors Inc., Toledo, O., has been elected executive vice president of the company.

—o—

Willard R. Gates has been appointed western Michigan representative by Wheel Trueing Tool Co., Detroit, to succeed the late **George F. W. Reid** in that territory.

—o—

J. L. Mauthe, vice president in charge of operations, Youngstown Sheet & Tube Co., Youngstown, has been elected a director of the company, succeeding the late **Newell C. Bolton.**

—o—

Walter E. Remmers has been elected president, Electro Metallurgical Co., New York. He also has been elected president of Electro Metallurgical Co. of Canada Ltd., and other associated metallurgical units of Union Carbide & Carbon Corp. Mr. Remmers has been vice president and director of Electro Metallurgical Co. since April, 1945, and associated with various metallurgical units of Union Carbide since 1936.

—o—

Giles R. Locke has been named assistant to the vice president in charge of operations of Republic Steel Corp., with headquarters at Youngstown. He succeeds the late **W. M. Neckerman.**

—o—

Leslie A. Touzalin has been appointed consulting engineer, and will contact blast furnace operators and engineers for Great Lakes Carbon Corp., Niagara Falls, N. Y. He had retired from Carnegie-Illinois Steel Corp. after 41 years with the United States Steel Corp.

—o—

Eastern Stainless Steel Corp., Baltimore, announces election of **Lachlan Mackenzie** as president of the corporation to succeed **John M. Curley**, who will continue as chairman of the board and president of the subsidiary company, Industrial Steels Inc., Cambridge, Mass. **W. T. Swomley** has been elected treasurer of the corporation. Mr. Mackenzie has been connected with Eastern Stainless Steel Corp. since 1944 in the capacities of assistant to the president and executive vice president. He had previously been associated with Crucible Steel Co. of America as engineering consultant. **Robert F. Johnston** has been named assistant general sales manager of the corporation.

—o—

John J. Howard, vice president, E. J. Lavino & Co., Philadelphia, has retired after 32 years with the company, and an active association with the blast furnace industry for more than 40 years.

—o—

Richard H. Diesel has been appointed assistant general sales manager of the Stamford Division of Yale & Towne Mfg. Co., at Stamford, Conn. Since 1945, Mr. Diesel has been manager of aircraft and automotive sales, with headquarters at Detroit.

—o—

Graeme K. Howard has been appointed by Ford Motor Co., Dearborn, Mich., as a consultant to survey the company's International Division and its foreign subsidiaries. Mr. Howard retired in mid-1947 as vice president of overseas operations at General Motors Corp.

—o—

Daniel D. Strohmeier will succeed the late **W. H. Collins** as vice president in charge of the Shipbuilding Division, San Francisco, of Bethlehem Steel Co. He has been with that division during his entire business career, and assistant to the vice president since 1942, with offices at New York.

—o—

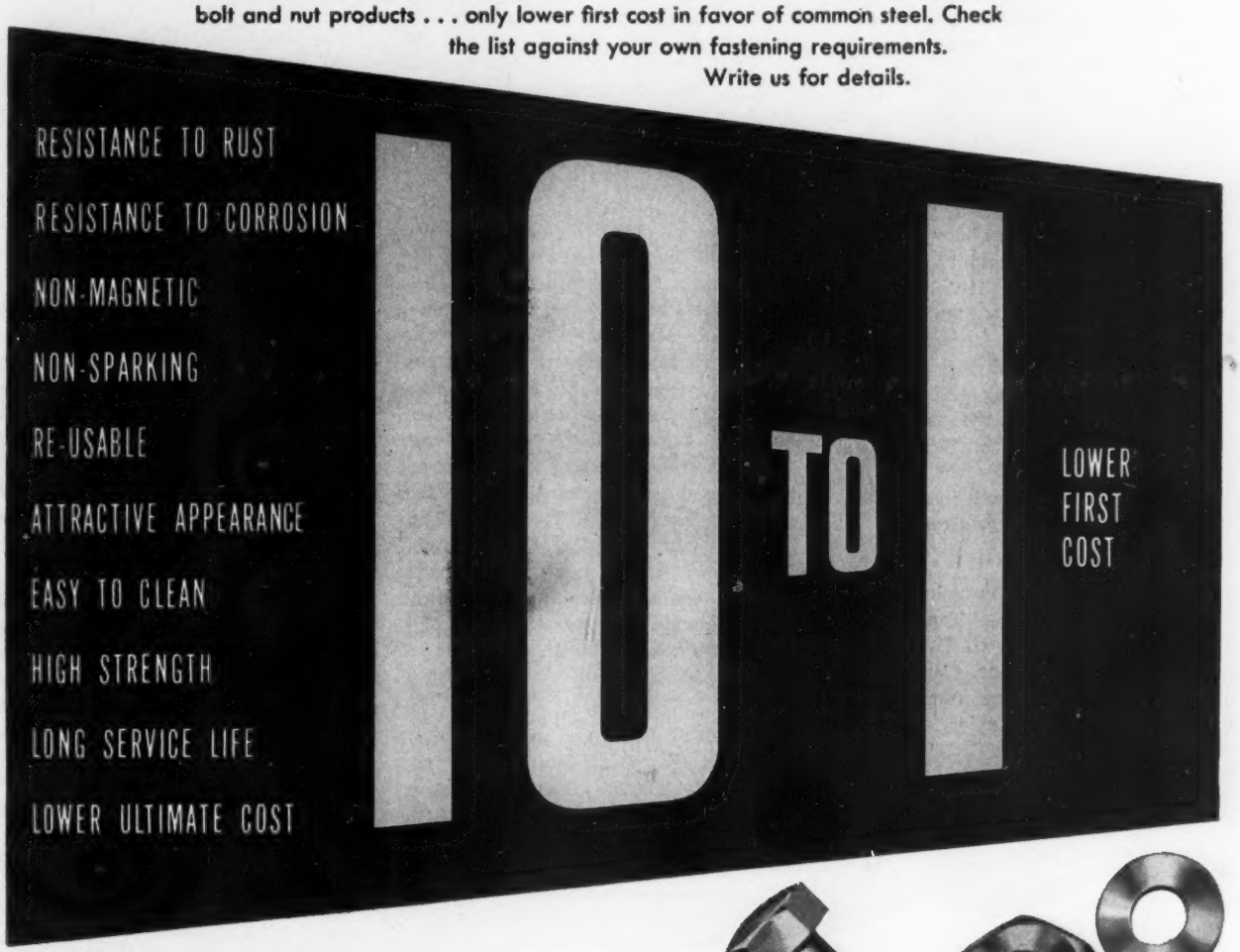
Baldwin Locomotive Works, Philadelphia, announces election of **R. F. Doolittle** as vice president, legal; **Frank B. Powers,** assistant vice president, engineering; **R. B. Crean,** assistant vice president, production; **R. N. Watt,** assistant vice president, domestic sales; **C. A. Campbell,** assistant vice president, foreign sales.

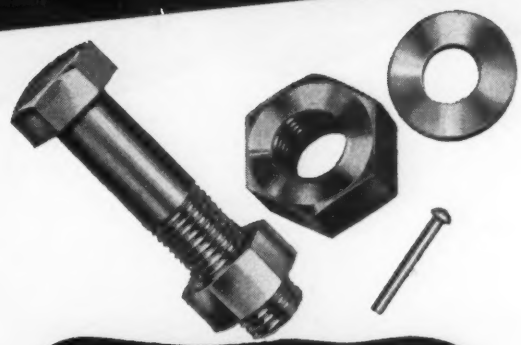
—o—

De Laval Steam Turbine Co., Trenton, N. J., announces executive promotions and organizational changes affecting Sales, Production and Engineering Divisions. Under the re-organization a five member executive

IT'S HARPER *Everlasting Fastenings*
TEN TO ONE OVER COMMON STEEL

Here's the score, 10 or more reasons for using everlasting fastenings . . . *just 1 for common steel.* An amazing combination of advantages in favor of non-ferrous and stainless bolt and nut products . . . only lower first cost in favor of common steel. Check the list against your own fastening requirements. Write us for details.





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committee has been created consisting of **H. L. Watson,** president, serving as chairman; **G. G. Stoddard,** chairman of the board; **Henry W. Johnson,** vice president; **C. Richard Waller,** vice president, and **George W. Smith Jr.,** assistant to the president. In executive promotion **J. P. Stewart** has been appointed manager of a newly combined Commercial and Marine Sales Division, succeeding **H. V. Peterson,** who has retired after 34 years' service. **H. G. Bauer,** manager, Marine Division, has been appointed executive engineer of the company. **J. W. Hertzler,** manager, worm gear sales, has retired and is succeeded by **W. A. Reynolds,** who becomes manager of combined IMO Rotary Pump and Worm Gear Divisions. **C. A. Jurgensen** has been appointed acting works manager.

—o—

Allen W. Jacobson has been appointed Seattle Division experiment department manager of Seattle-Boeing Airplane Co., Seattle, and **C. B. Gracey,** factory service manager. **G. F. Brott** has been named supervisor of the service publications section, succeeding **E. F. Lewis,** who has been appointed acting assistant B-50A project engineer. **L. D. Duerst** assumes Mr. Brott's former duties as supervisor of the training section.

—o—

W. K. Cox has been named advertising manager, Caterpillar Tractor Co., Peoria, Ill., succeeding **G. M. Walker,** retired. **J. J. Valentine,** Central Dision sales manager, succeeds Mr. Cox as assistant general sales manager, and, in turn, is succeeded by **F. D. Haberkorn. J. W. Mohler** assumes Mr. Haberkorn's duties as sales training division manager, and is replaced as assistant Central Division sales manager by **Herman S. Eberling,** formerly Western Division district representative. **Mark A. Clements** has been appointed general service manager of the company, to succeed **D. O. Nash,** resigned, and **J. Dean Uhll,** Central Division service manager, succeeds Mr. Clements as Western Division service manager. **Ellsworth M. Iverson** succeeds Mr. Uhll as Central Division service manager, and Mr. Ellsworth's post as service engineer is taken by **T. M. Fahnestock.**

—o—

New officers elected by Interstate Engineering Corp., El Segundo, Calif., are: **L. D. Fedderman,** president; **Frank E. Booth,** executive vice president and treasurer; **John E. Koster,** vice president and secretary; **J. S. Gallagher,** vice president in charge of manufacturing; and **H. W. Darling,** assistant secretary. New directors elected to the board include Mr. Fedderman, Mr. Booth and Mr. Koster of Los Angeles, and **Jerome Spanier** of Chicago.

—o—

Richard K. Mellon has been elected a member of the board of General Motors Corp., Detroit.

—o—

Personnel changes in the Special Chemicals Division, Pennsylvania Salt Mfg. Co., Philadelphia, are as follows: **Albert H. Clem** has been appointed to a newly created position as field sales supervisor. **Philip C. Staples Jr.** succeeds Mr. Clem as product supervisor on cleaners and pickling and descaling products. Succeeding Mr. Staples as product supervisor on corrosion resistant products is **Robert R. Pierce.**

—o—

Charles J. Sauter and **W. Paul Moorhead** have been appointed district agents for stampings and steel, Worcester Pressed Steel Co., Worcester, Mass. Mr. Sauter takes over the New York and northern New Jersey territory, replacing **G. H. Jernberg.** Mr. Moorhead will represent the company in northern New England. **George E. Gates,** formerly traffic manager, has been appointed assistant sales manager, and **Clifton Swanberg,** formerly shipping foreman, assumes the duties of traffic manager. **James G. Walker** has been appointed assistant superintendent of the company. He has been associated with Consolidated Vultee Aircraft Corp.

—o—

Russell G. Ford has been appointed general purchasing agent for the Chevrolet Motor Division, General Motors Corp., Detroit. He joined the Chevrolet plant and production engineering department in 1922, and has served as general purchasing agent of the central office since 1940. **G. M. Haley** has been promoted from assistant purchasing agent of the central office to succeed Mr. Ford in that office.

—o—

Thomas J. Bannan, president, Western Gear Works and Pacific Gear & Tool Works, Los Angeles and San Francisco, has been elected a national vice president of the National Association of Manufacturers.

—o—

Charles A. Avant has been named district sales manager, Youngstown Steel Products Co., Youngstown Sheet & Tube Co., subsidiary. He has been with the Washington office for several years.

—o—

Thomas E. Bertelsen has been appointed district sales manager of the Indiana-Michigan area, Universal Atlas Cement Co., U. S. Steel Corp. subsidiary. He succeeds the late **Theodore R. Prell.**

—o—

International Business Machines Corp., New York, announces the appointment of three district sales managers as follows: **McLain B. Smith,** district 10, with headquarters in New York; **Edward C. Strandine,** district 1, with headquarters in Albany, N. Y.; and **Thomas A. Kirkland,** district 3, with headquarters in Atlanta.

—o—

L. B. Smith, vice president and director of A. O. Smith Corp., Milwaukee, has been appointed general manager of the Kankakee Works of that company, taking over the duties of **H. F. Detrick,** who has held that post since the Kankakee Works went into production, in addition to his former duties as president of Smith Meter Co., Los Angeles, a wholly owned subsidiary, to which he now will devote his full time.

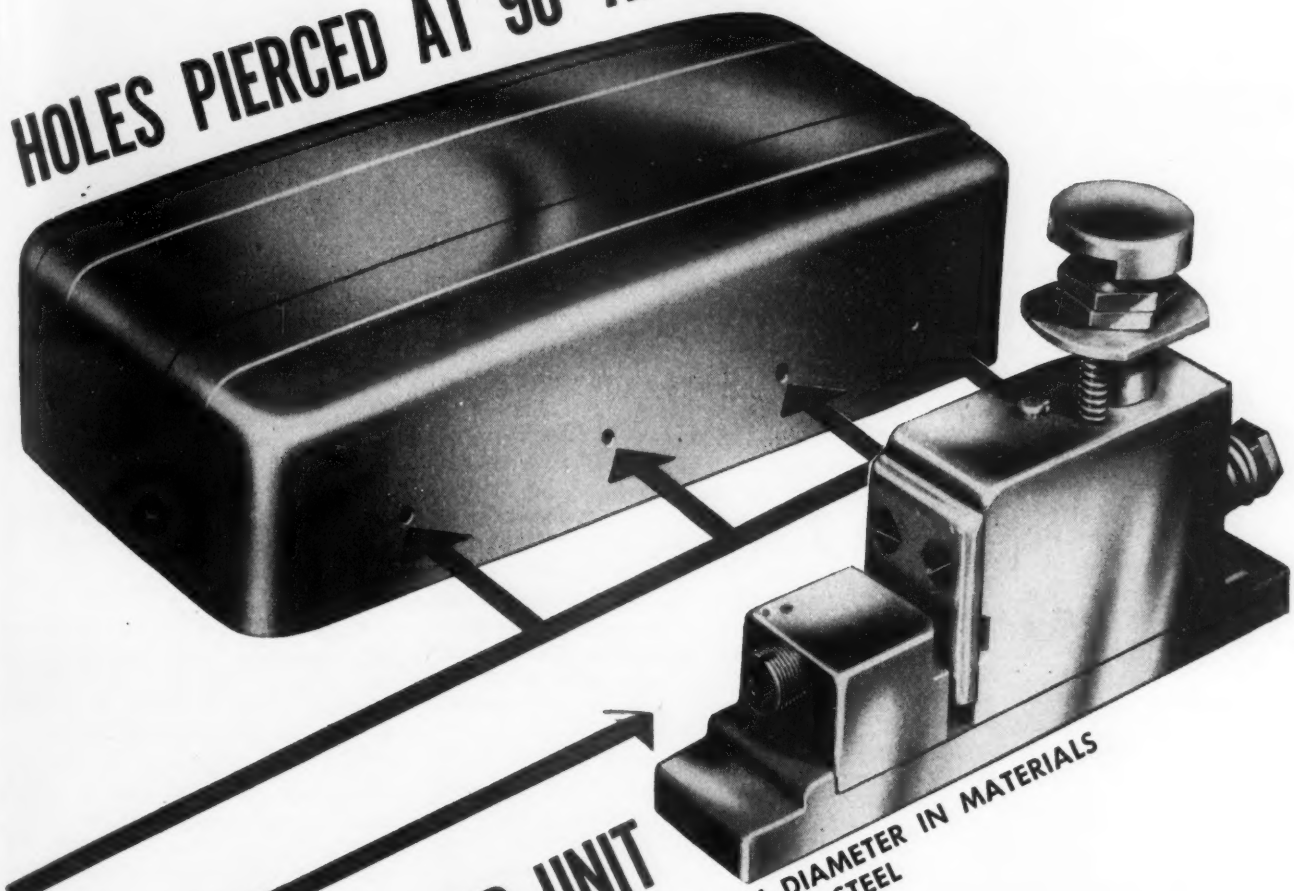
—o—

Appointment of **Marvin C. Barnum**

RUSSELL G. FORD

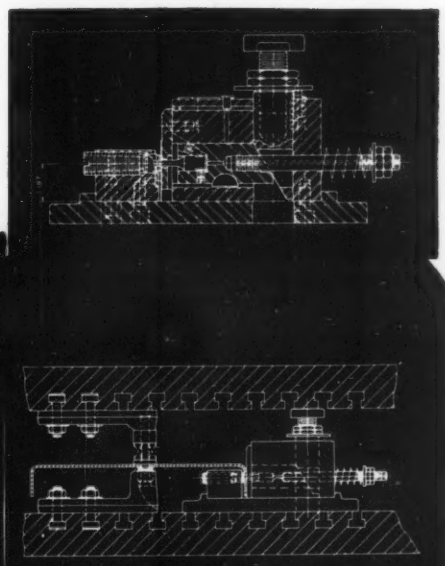
L. B. SMITH

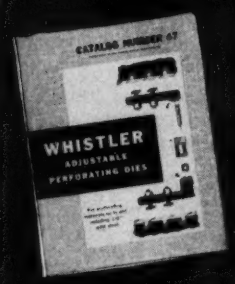
HOLES PIERCED AT 90° ANGLE . . .



with NEW WHISTLER UNIT

PERFORATES HOLES UP TO 1/2" IN DIAMETER IN MATERIALS TO 1/16" THICK MILD STEEL





DETAILS EXPLAINED IN CATALOG NO. 47

Extruded shapes, ells, angles and other molded, shaped or fabricated pieces are easily pierced from the side at 90° with HU-50 Perforating Units. Quickly set up and adjustable, these units may be used separately or with standard perforating equipment. The advantages provided by other Whistler Adjustable Dies are retained. Absolute accuracy is assured. Quick change-over of hole arrangements can be made . . . in many cases, on the press. Production economies and speeded up operating schedules are effected. Continued re-use of units in different groupings spreads initial cost.

It makes sense to look into the use of Whistler Adjustable Dies for all perforating, notching, slitting or rounding operations.

as representative in New York has been announced by Dayton Rogers Mfg. Co., Minneapolis. He served, following service in the Navy, with Reconstruction Finance Corp., Machine Tool Division, in the Office of Surplus Property, and later transferred to the New York office of War Assets Administration in the same capacity.

—o—

George R. Sommers, formerly Pacific Coast manager of lighting products for Sylvania Electric Products Inc., New York, has been appointed director of sales for all products divisions of the company in that area.

—o—

J. Robert Pauline has been appointed works manager for the Kellogg Division of American Brake Shoe Co., New York. Formerly assistant to the vice president in charge of operations and engineering, Mr. Pauline has served in various supervisory capacities since 1943 when he joined the company as an engineer.

—o—

Robert Heller, head of Robert Heller & Associates, Cleveland, industrial consultants, has been elected a director and member of the executive committee of Jack & Heintz Precision Industries Inc., Cleveland.

—o—

T. L. Parker has been appointed manager of the warehouse branch and district sales office at Philadelphia of Columbia Steel & Shafting Co. and its divisions, Edgar T. Ward's Sons Co. and Summerill Tubing Co. He succeeds **R. C. Cowan,** transferred to the managerial position at Syracuse, N. Y.

—o—

George E. Richardson has been appointed assistant to the manager of the Feeder Division, Westinghouse Electric Corp., Pittsburgh.

—o—

D. E. Brown has been appointed to take charge of the Cincinnati sales office of Barber-Colman Co., Rockford, Ill. He succeeds **M. N. Hough,** retired.

—o—

General X-Ray Corp., Milwaukee, announces the following appointments: **R. L. Lefevre,** formerly manager of the Washington branch sales office, has been named head of the sales department, directing the activities of the company throughout the United States and Canada. **W. D. Crelley,** manager, advertising and sales promotion department, has been appointed head of a new merchandising department. **G. W. Happe,** assistant to the vice president in charge of sales, has been named manager of a newly created products department. **L. L. Ludwigsen,** manager, merchandise department, has been appointed head of a newly created services department, directing engineering services and commercial services.

—o—

Stanley Newbrander has been named assistant vice president in charge of quality control for Weirton Steel Co., Weirton, W. Va., and **Ormond W. Claypoole** has been named chief metallurgist of the company. Mr. Newbrander, former chief metallurgist, succeeds the late **John D. Gold.** Mr. Claypoole succeeds Mr. Newbrander as chief metallurgist.

—o—

Frank J. Nugent, formerly general manager of appliance sales for Rheem Mfg. Co., San Francisco, has joined Bryant Heater Co., Cleveland, as sales production manager.

—o—

R. L. Smith has been appointed sales and promotion manager of the Simplicity Mfg. Co. at Port Washington, Wis., and will direct sales of all the firm's garden tractors and attachments.

—o—

Robert H. Harris has been appointed assistant general manager, and **Carl E. Dreher,** sales manager, of the Westinghouse Electric International Co., subsidiary of Westinghouse Electric Corp., Pittsburgh. Mr. Harris, sales manager since 1946, succeeds **Douglas C. Lynch,** who is on leave of absence from the company.

—o—

Pennsylvania Salt Mfg. Co., Heavy Chemicals Division, announces that **E. G. Warren,** formerly a representative in the Philadelphia area, has been transferred to the northern Ohio and northwestern Pennsylvania territory, and **C. Harvey Anderson,** from Chicago to the Wisconsin and Minnesota territory. **A. C. Jones,** manager of the company's Order and Warehousing Division, has returned to his former position as a sales representative in the Philadelphia area. **Harold S. Davenport** has joined the division, and now is undergoing training at the Philadelphia office.

—o—

J. I. Case Co., Racine, Wis., announces appointment of **H. H. Hudson** as manager of the firm's recently acquired Anniston, Ala., plant. He has been manager of the company's Burlington, Iowa, plant for the past 10 years.

—o—

Stearns Magnetic Mfg. Co., Milwaukee, announces appointment of **Herbert L. Piasecki,** former office manager, to the position of assistant treasurer, and **A. B. Paape,** as assistant secretary.

EUGENE G. SHEASBY

Appointed manager, Market Development Division, United States Steel Supply Co., in the general sales department, at Chicago. Noted in STEEL, Jan. 26 issue, p. 44

—o—

Ward Grantham has joined Nathan Mfg. Co., New York, as assistant to the president. He formerly had been assistant to the president, P. R. Mallory & Co. Inc., Indianapolis.

—o—

James P. Tate has been appointed Brazilian sales agent and service engineer for Herman Pneumatic Machine Co., Pittsburgh. He will have headquarters at Sao Paulo.

—o—

Cecil W. Brown, general sales manager, Le Roi Co., Milwaukee, has resigned from the company to join the Carson Machine & Supply Co., Oklahoma City, Okla.

—o—

W. J. Vossbrinck has been appointed sales manager, Cleco Division, Reed Roller Bit Co., Houston, Tex. This division has been recently organized by the company for manufacture and world-wide distribution of rotary and reciprocating pneumatic tools for general industry.

—o—

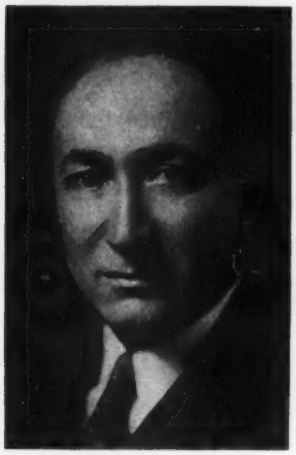
Robert H. Fuller has joined the H. K. Ferguson Co., Cleveland, as a contract engineer in the eastern district, and will work on new business for both the Domestic and Export Divisions of the company. He will make his headquarters in New York.

—o—

Promotions of technical sales personnel, Air Reduction Sales Co., New York, are: **Dr. G. V. Slottman,** formerly manager, Technical Sales Division, has been appointed technical assistant to the vice president. **Scott D. Baumer,** formerly assistant manager, Technical Sales Division, has been appointed manager of that divi-

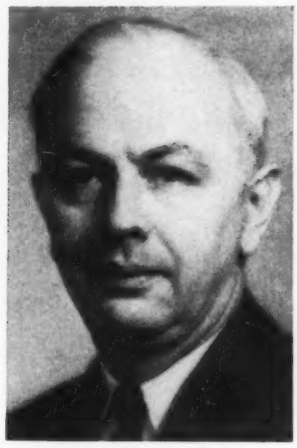
E. GEORGE HARTMANN

Appointed general sales manager, John A. Roebling's Sons Co., Trenton, N. J. Noted in STEEL, Jan. 26 issue, p. 47



DR. HAIG SOLAKIAN

Elected president, John Ek Industries Inc., Guilford, Conn. Noted in STEEL, Jan. 26 issue, p. 47



WILBUR DEUTSCH

Appointed general sales manager, Trabon Engineering Corp., Cleveland. Noted in STEEL, Jan. 26 issue, p. 47

sion, and **Edward H. Roper,** assistant manager.

—o—

A. W. Steudel has been elected a director of Republic Steel Corp., Cleveland, to succeed **James Bruce,** who has been a director since 1932, and who was appointed ambassador to the Argentine by the U. S. government. President of the Sherwin-Williams Co., Cleveland, Mr. Steudel is also a director of the Sherwin-Williams Co. of Canada Ltd.

—o—

James Parks has been appointed sales representative in the Cleveland district for Swedish Gage Co. of America, Detroit, and Moore Special Tool Co. Inc., Bridgeport, Conn. He will have offices in the Penton Bldg., Cleveland, and will specialize in precision machinery and gages.

—o—

Jeffrey Mfg. Co., Columbus, O., announces the following changes in branch office personnel: **Howard S. Davies** has been transferred from the Baltimore office to Chicago as district manager, Conveyor Division. **H. C. Rockwell,** formerly of the Columbus district office, succeeds Mr. Davies as district manager at Baltimore, and **Paul M. Hendry** succeeds Mr. Rockwell at Columbus. **W. K. Myers,** formerly of the New York office, succeeds the late **B. L. Lewis** as district manager of the Boston office. **H. A. Lee** of the St. Louis office has been appointed district manager of that office, succeeding **F. L. Kolb,** who has been named district manager, Mining Division, at Chicago. The following sales engineers have been transferred from the Columbus office to the various district offices: **E. J. Woltz,** Harlan, Ky.; **J. R. Brisley,** Philadelphia; **N. S. Bell Jr.,** New York; **W. T. Davis,** Houston, Tex. **J. W. St. John** has been transferred from the Pittsburgh office to the Cleveland office.

—o—

Randall L. Kamischke has been appointed New York state representative for U. S. Broach Co., Detroit. Prior to his appointment, Mr. Kamischke served the company as chief engineer for the past three years.

—o—

Merle J. Graham has been appointed manager of the West Leechburg, Pa., plant of Allegheny Ludlum Steel Corp., Pittsburgh, and **Frank G. Benford,** assistant plant manager. Mr. Graham joined the company in 1933, and since early in 1947 has been acting plant manager. Mr. Benford joined the company in 1945 as chief metallurgist of the West Leechburg plant.

—o—

Joseph E. C. Swan and **Harold G. Cutright** have been elected directors of Ralston Steel Car Co., East Columbus, O., to succeed **B. C. Hanna** and **J. E. Brate.**

—o—

H. Merrill Bowman, district sales manager of the Baltimore, Md., office of Link-Belt Co., Chicago, has been appointed assistant divisional sales manager for power transmission equipment, with headquarters at the company's Pershing Rd. plant in Chicago. **Eugene S. Bogart** has been appointed district sales manager to succeed Mr. Bowman at Baltimore.

—o—

Walter V. Hall, market specialist, has been appointed sales manager, Bear Mfg. Co., Rock Island, Ill., succeeding **Edward Quekels,** named director, product development and service department.

OBITUARIES . . .

John K. FitzGerald, sales and advertising manager, Press Division, Lima-Hamilton Corp., Detroit, died Jan. 19 following a heart attack. Prior to joining Lima-Hamilton, Mr. FitzGerald had been associated for 15 years with Niagara Tool & Machine Works, serving for the past seven years as district manager in Cleveland.

—o—

Arthur M. Morgan, 58, vice president, Latrobe Electric Steel Co., Latrobe, Pa., died Jan. 26 at his home in Cranford, N. J. He had been with Latrobe Electric Steel Co. for 20 years, and had been manager of its Pittsburgh, Detroit and Toledo offices.

—o—

John D. Gold, 55, assistant vice president of quality control, Weirton Steel Co., Weirton, W. Va., died recently.

—o—

Paul Winkler, 48, purchasing agent, A. O. Smith Corp., Milwaukee, died recently of a heart attack. He had been with the company 23 years.

—o—

Frank S. Krebs, 59, owner of Krebs Electrical Co., Rome, N. Y., and operator of the Rome Bicycle Mfg. Co., died Jan. 24.

—o—

Albert H. Chatley, 55, vice president and general manager, Delta Mfg. Co., Milwaukee, died Jan. 24.

—o—

S. E. Tray, 43, consulting chemical engineer, Allis-Chalmers Mfg. Co., Milwaukee, died Jan. 17 after a short illness.

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Nowhere else can you get this valuable information . . . so clearly, concisely gathered into one reference book!

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The best methods for designing, assembling, and finishing draw dies, blanking and forming dies and punches are outlined in the five sections of this *Die Engineering Manual.* It's thoroughly illustrated, too—with over 100 pictures and diagrams to help explain applications and operations.

Whether or not you are already using Carboloy Cemented Carbides in your shop, send for this Manual. It may lead you to new, profitable applications . . . or help you improve your designing, assembling or finishing methods.

Today's big trend is toward carbide dies. And here is information to help you lead the trend. Carboloy dies mean longer die life, fewer rejects, better finish, closer tolerances, lower costs. The *Carboloy Die Engineering Manual* contains much information that will be of real interest to you about this hardest metal made by man.

SECTION ONE, by way of introduction, gives a brief review of what Carboloy Cemented Carbide is and of its principal advantages to the die maker and user.

SECTION TWO shows typical applications of Carboloy Cemented Carbide sheet-metal dies and punches . . . a multitude of suggestions for cost-saving applications.

SECTION THREE is a basic outline of designing, assembling, and finishing methods for draw dies.

SECTION FOUR gives similar information on designing, assembling, and finishing blanking and forming dies, clearly treated and illustrated.

SECTION FIVE outlines designing and finishing methods for punches.

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CEMENTED CARBIDE

Engineering News . . . AT A GLANCE

SIMULTANEOUS MACHINING—All crankpins of an automotive crankshaft will be turn-milled at one time by a machine now being completed by Gisholt Machine Co., for Chrysler Corp. in its Madison, Wis. plant. The machine is powered to produce 24 crankshafts in a 48-minute hour, but it is believed the 50-ton tool may exceed this production rate. The two headstocks of the machine are driven from a common drive to rotate the work. Movement of three 24-inch milling cutters is controlled by cams. In all, nine separate Fairbanks-Morse motors are used to operate the mill.

CUTS METAL EROSION—By designing the center member of its flexible coupling so that the bearing strips slide on only the center block to which they are secured, American Flexible Coupling Co., Erie, Pa., recently increased the wearability of each unit by as much as 30 per cent. The coupling is based on the Oldham principle, in which the center member or block has a free sliding action between the two jaw flanges of the coupling. The coupling permits shafts to operate misaligned without transmitting reactionary stresses.

OPERATION TIMER—Use of a nonsynchronous welding control mounted on the rear of a standard high-speed rocker arm welder enables functions of squeeze, weld, hold and off to be calibrated in cycles while processing such items as fan guards in the Pittsburgh plant of Westinghouse Electric Corp. Each of the functions is easily set for the job at hand by preadjusting proper dials.

SIMILAR BUT DIFFERENT—Torque converter of Buick's new Dynaflow transmission, it is explained, looks like a fluid coupling and even behaves like one when the propeller shaft speed is about 0.85 per cent of engine speed. But there similarity ceases. Actually the converter is composed of five independent rotating members—primary pump, secondary pump, turbine, primary stator and secondary stator. The two reaction or stator stages include curved blades in reverse direction with respect to curvature of blades in the pumps and turbine. All five rotating members are made of aluminum castings produced by the Antioch plaster mold technique.

ALL IN ONE "BASKET"—During the course of a single postwar year, it was learned in New York, Western Electric's production of telephone instruments alone requires, among other things, 11,000,000 pounds of steel, 1,359,000 pounds of aluminum, nearly 4,000,000 pounds of brass, about 1,500,000 pounds of zinc and more than 4,000,000 pounds of molding powder and compounds.

CYCLIC ANNEALING—In a method of cyclic annealing forgings now being worked out by an auto maker, degree of annealing can be controlled within very close limits in order to produce a structure offering the highest quality of machinability. According to E. F. Houghton & Co., Philadelphia, present procedure involves introduction of hot forgings as they leave the press into a salt bath operating at a temperature below the critical and above the nose of the S-curve of the particular steel. Parts are held in the bath for the time indicated by the curve for completion of the transformation. Treatment is said to produce a uniform, coarse, pearlitic structure.

MUFFLE-ANNEALED—To equalize the stress developed during the continuous drawing of 0.044-inch copper-coated, tubular rivet wire for extruded point rivets, it is muffle-annealed for 3 hours until completely spheroidized. This treatment also reduces the tensile strength of the wire to the customer's specification inasmuch as this strength jumps considerably during the drawing. (p. 98)

STACKED FROM ANY FLOOR—In the Pittsburgh plant of Oliver Iron & Steel Co., packaged products from any of the plant's floor levels are "shot" directly into the main shipping warehouse by means of a large spiral gravity conveyor. The conveyor is fed continuously by lift trucks, and delivery to the shippers hands is made by gravity-power alone. (p. 103)

SHIM CUTS STRENGTH—Investigations on various alloy steels reveal that both the thread and notch strength of bolts are 25 to 35 per cent higher than the ultimate strength. It is pointed out that the notched section appears slightly stronger than the threaded section, but this may be explained by such factors as differences in contour and decarburization. If a shim, however, is added under the nut, the bolts are found to possess a much lower strength than without a shim. (p. 104)

"RAGGING BLOOMERS"—New roll grooving or "ragging" machine recently installed in the plant of Weirton Steel Co., not only frees the services of an overhead crane formerly required to turn or rotate the roll on the planer bed, but also grooves the rolls smoothly—minus any chatter—in about 1¼ hours less time. (p. 108)

OXYGEN PAYS OFF—Use of oxygen in place of ore and other oxidizing materials to eliminate carbon in commercial grades of electric furnace steel in the plant of A. M. Byers Co., Ambridge, Pa., not only is shortening the normal heat cycle and increasing rate of production per hour, but also is realizing other cost savings which amount to some 50 cents per ton. Other lesser advantages of the practice include reduced volume of raw materials and slag to be handled and less manual labor. (p. 120)

Drawing Special Types of INDUSTRIAL WIRE

Improved facilities and drawing practices enable one midwest manufacturer to produce rope wire and music spring wire to meet restrictive requirements

MAJOR specialty of Keystone Steel & Wire Co., Peoria, Ill., is the drawing of steel wire for industrial purposes. Prior to 1932, the bulk of the wire produced was fabricated into farm fencing, nails, and barbed wire—the balance of the output of the three open hearth furnaces sold in semifinished form to other wire drawers and fabricators of wire products.

Decline of agricultural demand for fencing during the depression years revealed the firm's dependency on one segment of American economy. To serve other industries, it set about diversifying its facilities. It had proved profitable to specialize in steel wire tailored for end uses in the merchant line, so wire drawn for industrial specialties was adopted as a natural expansion.

Contact with the wire rope industry was already established and some wire was being supplied a nearby manufacturer. To expand this business, experienced personnel was imported, stringent standards adopted, practices improved, machines developed.

Rope Wire Analysis—To produce rope wire meeting the restrictive requirements in tensile strength, torsions, bends, and elongations, for various cable standards, the grades of steel shown in the accompanying table were developed. To produce this steel a high percentage of pig iron is charged, supplemented with selected, low alloy scrap. Heats average 175 tons. A metallurgist stands by when a heat is ready to be tapped and is charged with determining the steel's temperature, checking the addition of alloys and deoxidizers, calculating the time for teeming, and scrutinizing the cleanliness of the molds. Then while the steel is teeming in the hot top ingot molds he supervises additions and obtains samples of the heat for laboratory analyses. After filling, the top of the mold is insulated so that the steel's heat is sealed in, thereby aiding the even solidification and the production of sound steel.

"Repeater" Rolling—After the 3-ton ingots have solidified, they are transported to the blooming mill, stripped of the molds, and reheated in the soaking pits to a uniform 2300° F, the predetermined rolling temperature for this type steel. From the soaking pit the 19-inch square by 6-foot ingot is conveyed to the bloomer, whence it emerges 25 passes later as a 1⅞-inch round cornered, square billet.

Last four passes of this operation are combined in a "repeater"—the only one presently operated in the United States. This equipment affords the steel a superior surface since—(a) greater grain refinement and structural uniformity are developed; and (b) the steel is not subject to severe torsional stresses during the rolling operation.

The 450-foot bar, rolled from the ingot is sheared into 31-foot billets, which, after cooling, are individually inspected. Billets having any surface imperfections or internal defects are discarded. The acceptable billets are then sorted, tested, and tagged.

Semicontinuous Rod Mill—Gradually reheated to

2100-2150° F in a sloping hearth, billet reheating furnace, the billet enters the semicontinuous rod mill. This type mill combines the high capacity of a continuous operation with the less rigorous rolling practices of a looping mill, thereby discharging rods showing better surface and section. The steel moves rather slowly through the first six stands of the roughing mill, but it increases in speed through each successive set of rolls until finally it emerges from the last finishing stand.

Being multiple strand, this mill rolls approximately 800 tons of No. 5 gage rods in 24 hours. As can be seen in the diagrammatic sketch, Fig. 4, stands 1 to 6 inclusive of the roughing mill and stands 7 to 10 inclusive of the intermediate mill are driven by a 2360 horsepower motor. The steel is guided from stand 10 to stand 11 and from stand 12 to stand 13 through semicircular trough-like repeater guides which allow the desired looping. Intermediate stands 11 and 12 are driven by a 700 horsepower motor and the finishing stands 13 to 18 inclusive are driven by a 1180 horsepower motor.

As the rods leave the last finishing stand of the mill, they pass through guide pipes, to the power-driven reels, where they are coiled. The reel then lifts and dumps the bundle on the conveyor table which moves rods to the rod dock. There bundlers tie the rods and attach tags identifying the grade of steel, heat number, size, turn and date rolled. As a double check in keeping mixed steel to a minimum, metal tags are shaped distinctively for each grade of steel.

Rod Inspection—At the rod dock, both ends of the coil of rods are trimmed. Bundled rods are inspected for surface, size, section, and soundness. This consists of visual examination for slivers, overlaps and overfills, and micrometer gaging for size and section. Samples of the rod undergo a twist test followed by etching in sulphuric-nitric acid. Soundness is checked in the nick and break test by grinding the full cross section of a sample and subjecting it to a deep etch in hot muriatic acid.

Rods entering the wire mill are covered with a tight brittle iron-oxide scale whose thickness depends upon the degree of water quench in the rod mill reel pipes. With high carbon rods, little water is used for fear of brittleness resulting from the quench and hardening—consequently these rods have a heavier scale.

Rod Patenting—Patenting, the first step in the wire mill for most high carbon rods, is designed to minimize the harmful effects of carbon segregation, and by rebuilding the sorbitic structure of the steel to improve its cold drawing qualities. Rope wire steel rods pass through the 60-foot long patenting

Fig. 1—View of one of the hot dip galvanizing frames

Fig. 2 — Sixty-foot natural gas-fired furnace for patenting wire

Fig. 3 — Bundling music wire. Second layer of Kraft paper is applied over double wrapping of cellophane

furnace heated to 1800° at approximately 25 feet per minute, then are air quenched.

To give these rods the perfectly clean surface essential before drawing, a load of high carbon rods is lowered into a tub containing an agitated acid concentration of from 4½ to 5 per cent sulphuric acid maintained at a temperature of approximately 135° F. The rods are then hosed and rinsed with cold water. Dipping in a phosphate solution (lime substitute) follows, after which the rods are baked at 300° F for 1½ hours.

When a customer orders 0.053-inch plow rope wire with a tensile strength of 222,000-246,500 pounds per square inch, we use our grade 4 rope wire steel. To reduce the No. 5 gage rod to the desired wire size, we draw three holes from 0.207-inch (diameter of No. 5 rod) to 0.127-inch; patent and clean again, then pass through seven holes to meet our specified diameter 0.053-inch.

Water-Cooled Drawing—In undergoing this practice there are three single pass operations in which the wire is drawn, first through a 0.170-inch die, then a 0.148-inch, and finally a 0.127-inch die, all water cooled. Preliminary to every hole, wire passes through a commercial lubricant which protects wire surface from abrasion.

Tungsten carbide dies are used exclusively for wire drawing. These are bought in six sizes and the nibs reduced and polished to the exact dimensions desired. The approach angle of dies drawing rope wire is from 8 to 10 degrees while the bearing is 66 per cent of the diameter of the hole. After preliminary drawing the wire is patented, this time on the electrically controlled equipment which processes 60 tons daily. Thirty-six wires are simultaneously heated to 1550-1600° F, then quenched in a lead bath at 1050° F. Thus the stresses induced by drawing are relieved, and the structure normalized, again preparing the wire for its continued drawing.

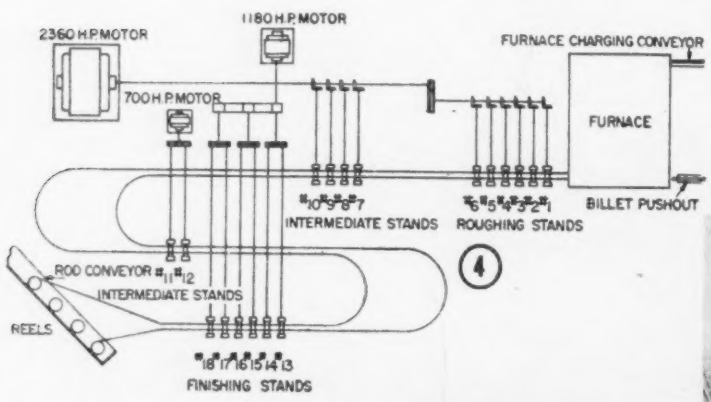


Fig. 4—Diagrammatic layout of 18-stand rod mill

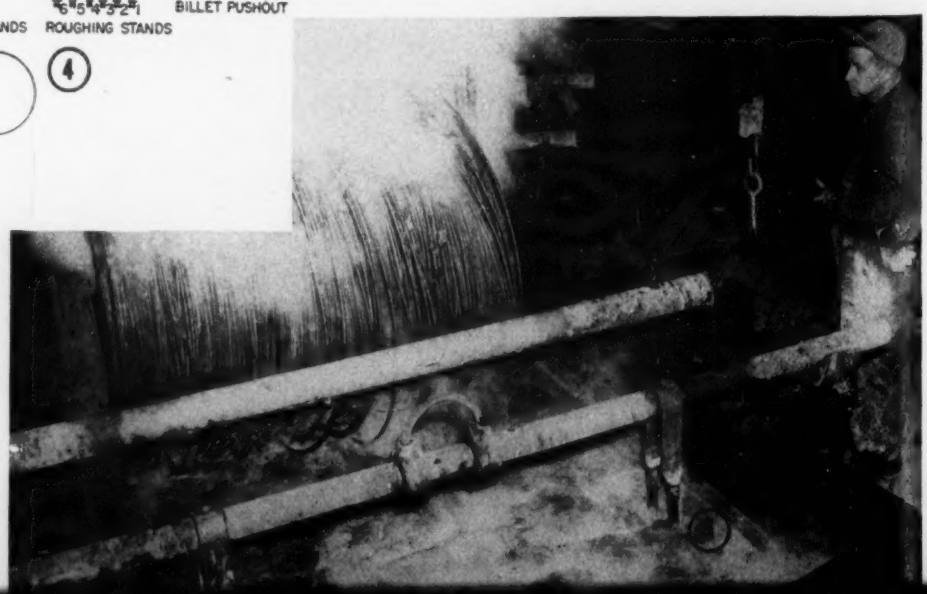


Fig. 5—Yoke of rods being withdrawn from agitated acid solution

ROPE WIRE STEELS

Grade	C	Mn	P Max.	S Max.	Si	Cu Max.	Basic T/PSI
6	.46-.56	.55-.65	.02	.035	.15-.20	.12	92/102000
5	.56-.66	.55-.65	.02	.035	.15-.20	.12	102/112000
4	.66-.74	.55-.65	.02	.035	.15-.20	.12	112/120000
3	.74-.80	.55-.65	.02	.035	.15-.20	.12	120/126000
2	.80-.86	.65-.75	.02	.035	.15-.20	.12	126/132000

Step Down Drawing — Once more the steel is cleaned in an active sulphuric acid solution, rinsed, dipped in a lime substitute, and baked. Then the wire is transferred to a continuous wire drawing machine where it rewinds on the final block with diameter of 0.053-inch. This drawing machine is one designed and built at this plant. For maximum efficiency and minimum heating of wire in process, it combines water-cooled dies, and water-cooled blocks. Use of this equipment retards precipitation hardening by keeping to a minimum the heat generated during drawing.

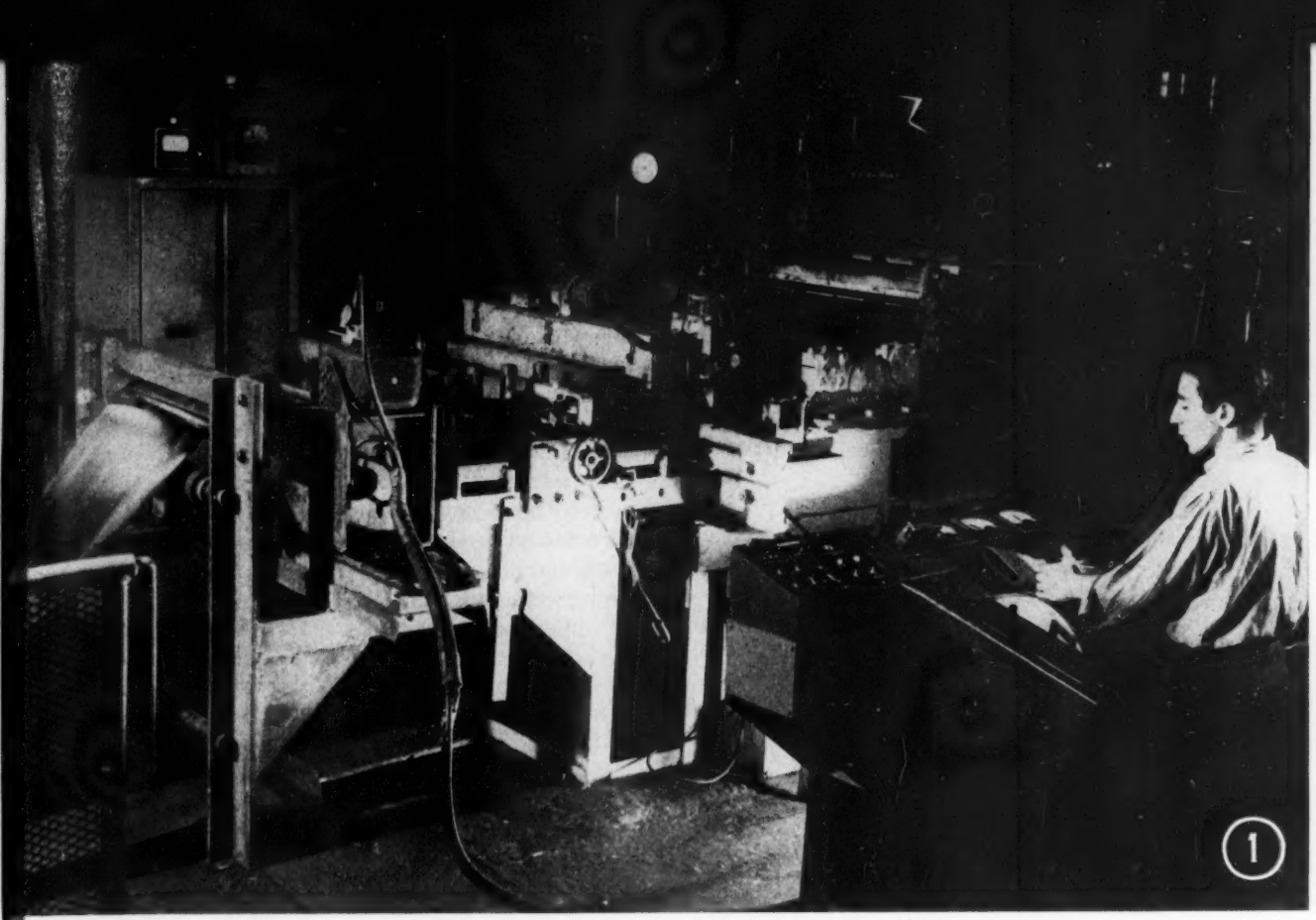
Another factor in successful high speed high carbon wire drawing is the decrease in the amount of reduction per draft as the wire is being drawn progressively to smaller and smaller sizes. Step-down drafting prevents sufficient heat being generated to cause embrittlement.

Samples from both ends of every coil of rope wire are miked and tested via bends, torsions, elongation, and breaking strength to insure the drawn wire conforming to the rope manufacturer's specifications.

Music Spring Wire—Another industrial wire produced to the satisfaction of discriminate manufacturers is music grade spring wire in sizes ranging from 0.010 to 0.135-inch. Specifications for this high grade spring wire are restrictive as to temper, tensile, tolerance, surface, finish and cast. Steel for this grade wire meets a basic tensile strength of 128/135000 pounds per square inch by conforming to the following chemical analysis:

C	Mn	P Max.	S Max.	Si	Cu
0.86-0.94	0.35-0.45	0.02	0.03	0.15-0.25	0.12 Max.

Its progress through the (*Please turn to Page* 114)



X-Ray Thickness Control Expected To

STEP UP SHEET OUTPUT

By W. N. LUNDAHL
Design Engineer
Westinghouse Electric Corp.
Baltimore

Sensitive method of comparing material to a correct sample may find wide application in thickness control of hot sheet metal and other products. Equipment now in use automatically rejects off-gage material in flying shear installations or controls screw downs to maintain uniform thickness in material coming off cold mill

PRESENT applications of x-ray to gaging metal sheet thickness indicate that this method of quality control has wide possibilities in modern high speed rolling mills. Increased output of prime sheets, solution of some operating problems and elimination of surface-marring are among the benefits expected.

Basic advantages of an x-ray gage for thickness are: No contact with the material, instantaneous response to changes and ready access to areas never before gaged. These unique characteristics are particularly important in view of the increased speed of mills in recent years. In 1928 the first tandem cold reduction tinplate mill was installed with a delivery speed of 340 feet per minute while the latest such mills to be installed have a delivery speed up to 6000 feet per minute.

Since the gage does not contact the material being

Fig. 1—Westinghouse x-ray thickness gage set up on a classifier and shear line at the tin plate mill at Jones & Laughlin Steel Corp.'s Aliquippa, Pa., plant. Attached to left side of operator's control desk is the remote control unit. Cable in foreground leads up to the gage itself on the strip. Smaller instrument in left background is thickness indicator

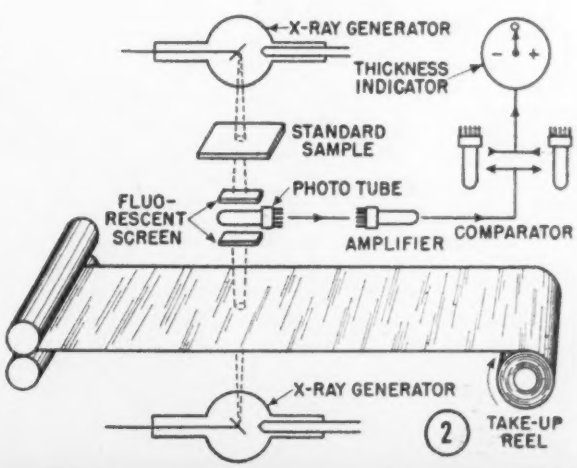


Fig. 2—Sketch showing arrangement of components

measured, it should be possible to modify it for use on hot materials. Thin materials like aluminum foil or paper that might be torn by a gage are other applications that will result from the no-contact feature. Moreover, greater accuracy is made possible on ordinary sheet measuring because an x-ray instrument cannot collect scale at a contact point, and is not affected by the centrifugal force of revolving parts or fluttering of the strip at high speeds.

Its possibilities are further illustrated by one installation where the thickness of lacquered sheet is measured. The gage does not include the thickness of the lacquer. The no-contact feature eliminates all possibility of marring the measured material.

Since the strip going through a hot mill cools somewhat toward the trailing end, it takes on the shape of a long, thin wedge. An x-ray gage inserted on the hot mill should make it possible to regulate the roll-setting accurately and thus eliminate such tapering. This in turn will eliminate the sudden change in thickness where the leading end of one strip is welded to the trailing end of another. Because of the thickness variation there is possibly a greater danger of breakage at the weld.

This instrument responds at high speed offering almost instantaneous control. It has recently been applied on classifier and shear lines in steel mills, where it is important to separate the prime from the off-gage sheets. Here its control of the discard mechanism is exacting. It is obvious that the extra quantity of prime sheet that the new gage will eke out of a strip will be of major economic importance to the steel producer.

Strip Measured Against Correct Sample—One model of the gage, Fig. 1, was designed for thicknesses of steel sheet from 0.005 to 0.505-inch; basic equipment with modification is the same for other applications. The gage has a sensitivity of 1 per cent. In other words if ten mil steel is standard (0.010) the device will indicate full scale for a change of 1/10 mil or 0.0001-inch from standard. With this sensitivity, a deviation of 0.00001-inch is readily discernable on the indicator instrument.

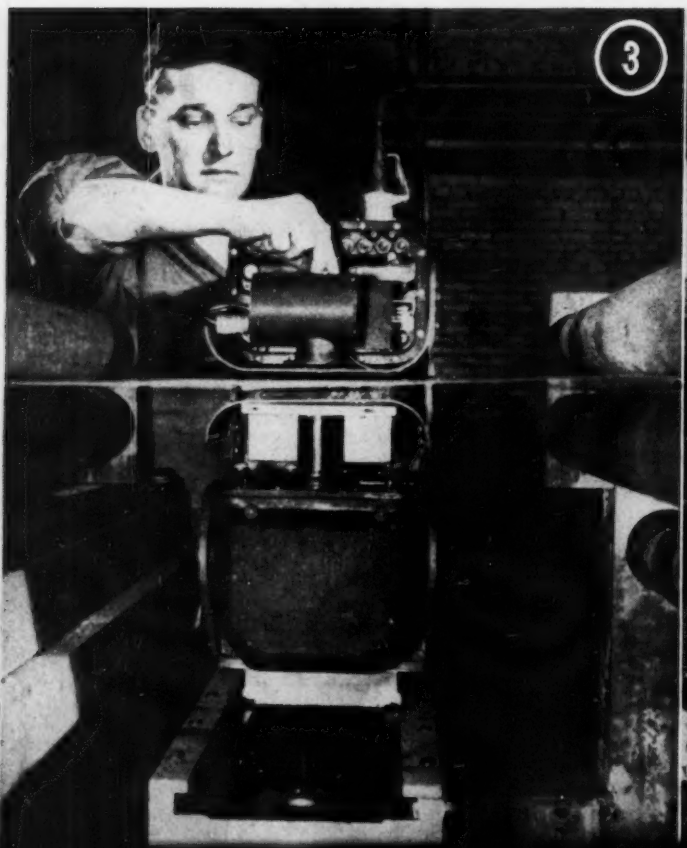
On the other hand if 50 mils (0.050-inch) is standard thickness, a change plus or minus of 0.0005 would be indicated by full scale deflection on the indicating instrument and 0.00005 would be readily discernable. In the laboratory, sensitivities of twice the above values have been obtained. Under normal circumstances however, these sensitivities are far too great for the metals industries. Maximum requirements to date have been only 1 mil in fifty or 2 per cent.

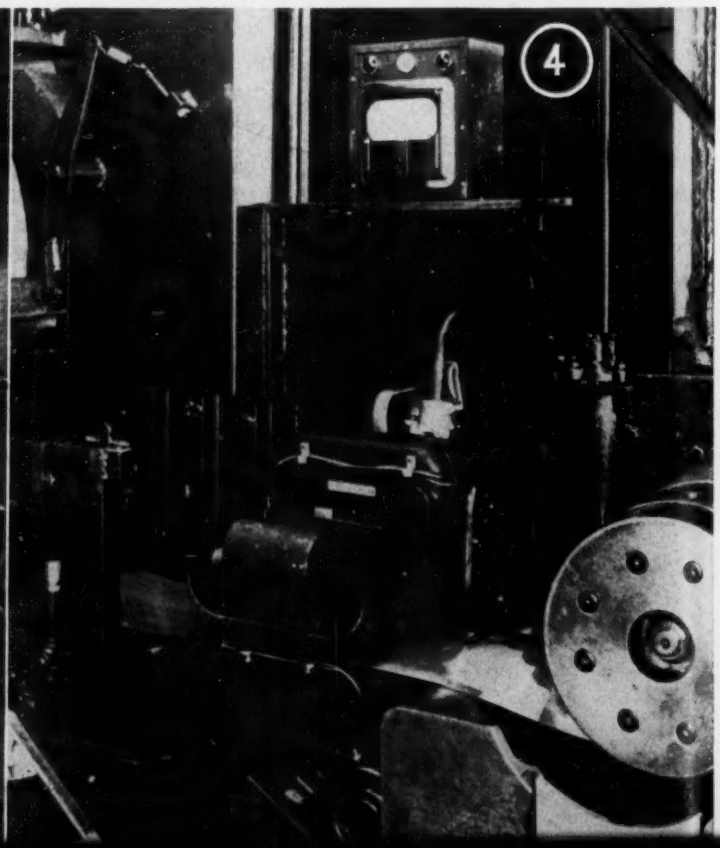
Actual gage designed by Westinghouse consists of two x-ray sources and one phototube pick-up device. Relative to the two x-ray sources, the pick-up is at the apex of a right angle. Radiation from the lower x-ray source is directed up through the sheet being gaged so that the transmitted rays will strike the pick-up. X-ray from the upper source is directed horizontally through a standard sample of correct thickness; that transmitted strikes the same pick-up. The two x-ray sources emit radiation 180° out of phase so that their rays alternate in striking the pick-up. The pick-up compares the intensities of the two x-ray beams after a large part of their radiation has been absorbed in the standard sample.

Any disparity in the (*Please turn to Page* 117)

Fig. 3—Front view of gage installed at Jones & Laughlin. The operator is sliding a different sample into place

Fig. 4—One stand cold reduction mill for copper equipped with x-ray thickness gage. X-ray source and pick-up unit are built on a rail-mounted truck. This enables scanning at any lateral position across the copper strip. Take-up mandrel is at right and indicator unit at upper center





PALLETIZING DOUBLES WAREHOUSE CAPACITY

By WILLIAM W. HILLER
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LIKE many other manufacturers, Oliver Iron & Steel Corp. found the immediate postwar period producing extraordinary demands on warehouse space. As in most plants, shipping warehouses are built just large enough to accommodate the flow of orders that are ready for shipment and offer a minimum of space for storage of any kind.

Palletizing with the aid of high lift fork trucks had been used during the war in a limited way to handle those shipments which specified that certain units be strapped to wooden pallets for further handling. This had proved very practical during our limited experience with the method. A survey of the ceiling heights in our warehouse space showed that by utilizing the high overhead area, capacity could be at least doubled.

A number of other circumstances, however, made the problem peculiar. From the package standpoint, bolts, nuts, various types of pole line hardware and automotive and railroad specialties were ideally suited to handling on pallets as the entire line was prepared for shipment in either kegs or wooden boxes. These products, however, are weighed or counted and packaged in a number of places throughout the plant on any and all of several different floor levels.

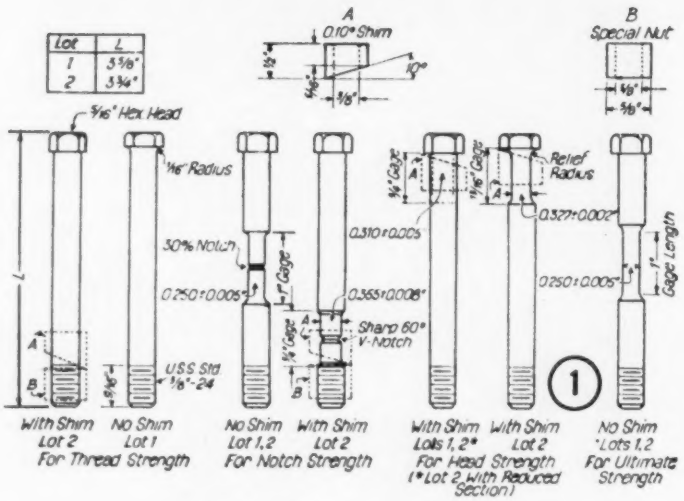
First step was to be certain that any new transportation and storage method we adopted would accommodate this condition. Nothing could better suit such a situation than mechanical lift trucks capable of running "lifts" of products (*Please turn to Page* 118)

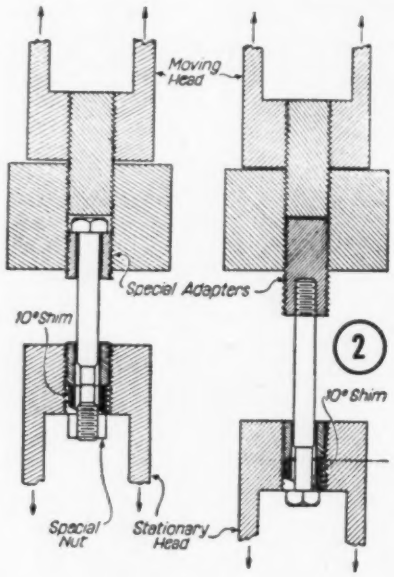
Fig. 1—Typical heights to which packaged materials in bags, boxes or kegs can be stored by fork trucks and palletizing

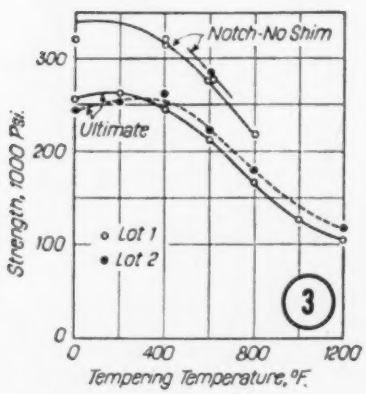
Fig. 2—This three-story spiral conveyor moves the product by gravity from various floor levels to the shipping area. Here the product is palletized and collected into carload shipments

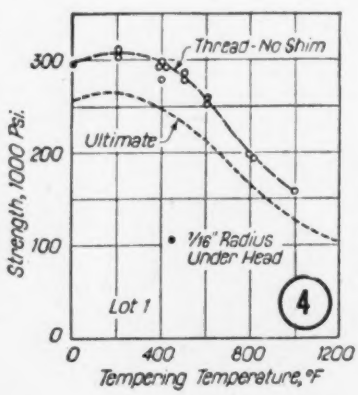
Fig. 3—Zinc ingots for hot dip galvanizing are supplied on zinc pallets, which are also usable. Steel banding is used to insure compactness and to prevent shifting in transit

How to Develop Maximum St









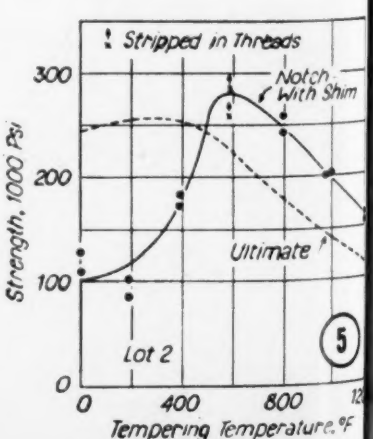


Fig. 1—*Nickel steel bolts were tested as received and in the sizes and arrangements shown here.* **Fig. 2**—*This tensile testing fixture was used for testing the bolts under tension and bending.* **Fig. 3**—*Ultimate and notch strength with no shim.* **Fig. 4**—*Thread strength with no shim.* **Fig. 5**—*Notch strength with shim.* **Fig. 6**—*Head strength with no shim.* **Fig. 7**—*Head strength with shim.* **Fig. 8**—*Effect of stress relief radius under head with a shim*

RECENT investigation on various alloy steels have shown that sharp notches reduce materially the strength and ductility of cylindrical test bars if the ultimate strength or "strength level" of the steel exceeded a value of approximately 200,000 pounds per square inch. Tubing subjected to internal pressure exhibited a similar, but not quite as pronounced, "embrittling effect" if the strength level of the steel exceeded a value of approximately 150,000 pounds per square inch.

Cylindrical notched bars and bolts were also found to break at reduced loads, in a brittle fashion, if their strength level was above 150,000 pounds per square inch and if a bending strain was superimposed upon the applied tension by means of shims placed under the heads of test bars or under the nuts of the bolts.

It was the particular purpose of this investigation to clarify some of the factors which might cause embrittlement of high strength alloy steel bolts. Bolts fabricated from SAE 2330 steel, were selected for the investigation. Most important fundamental factors influencing their strength are: 1. Various strength levels, as determined by the tempering procedure after proper hardening; 2. various shapes of the head, which was found more prone to rupture than the thread, in the range of conditions conducive to brittle breaks; 3. various types of loading, i.e., regular tension and tension with superimposed bending.

Two lots of SAE 2330 bolts, $\frac{3}{8}$-inch diameter and $3\frac{5}{8}$ and $3\frac{3}{4}$-inch total length, respectively, Fig. 1, were used for the investigation. They were heat treated by quenching from a vertical furnace containing forming gas into an airlift quenching tank with oil and tempering at various temperatures for an hour in an electric forced air convection type furnace. The hardening temperatures, 1500° F was maintained for one-half hour. All specimens were machined before

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Strength in Alloy Steel Bolts

Investigations reveal that bolts made of alloy steel will not develop full strength of material as indicated by the usual tension test, if bending is present, unless proper fillets are provided under the head

heat-treating; and the results, therefore, apply to a steel with a decarburized surface.

Test Results—In an early stage of the investigation, it was observed that various failures of the bolts occurred under varying conditions. Two major types of failure were recognized: Breaks through the thread, and breaks under the head. Also minor failures by stripping of the thread and through the cotter-pin hole of the bolts, lot 1, occurred occasionally. Such failures were disregarded in most instances.

Consequently, each test supplied, fundamentally, two values: (a) Strength of one of the two sections, the thread root section or the section under the head. (b) A stress below the strength of that section which did not fail.

In addition to test on bolts in the shape as supplied, tests were made also on bolts reduced in section at various points. Some such specimens were provided with a 60-degree sharp notch, which removed 30 per cent of the cross-sectional area of the reduced section. Further series of tests were made on bolts with an increased radius machined under the head. Also the ultimate strength was determined by testing specimens with a reduced cylindrical section.

Strength Determined — Thus, four different strength characteristics of the 2330 steel in various conditions of heat treating were determined: Strength through the thread, or "thread strength;" strength under the head, or "head strength;" strength through the notched section or "notch strength;" ultimate strength or "strength level" of a cylindrical section.

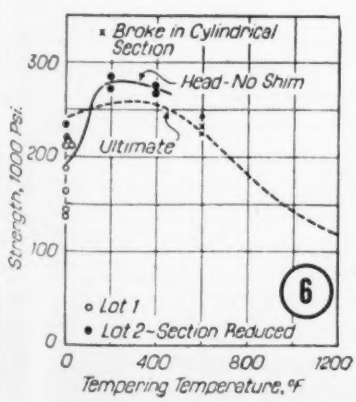
With the exception of the cylindrical machined bar, all other types of test bars were subjected to tensile test in two ways: By means of regular ball-seat fixtures; with a tapered shim or washer having an angle of 10 degrees.

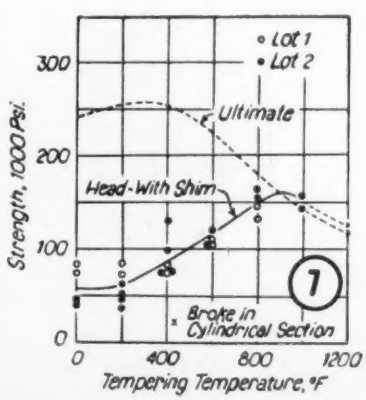
Tapered shim results in eccentric loading of the test bar, or in a superposition of bending on the applied tension. This eccentricity will be higher in the sections closed to the shim than in sections farther away. This enables one to apply a higher eccentricity to the thread (or notch) than to the section under the head and vice versa, Fig. 2. The rolled thread, as well as the corners under the head, and also the machined sharp notch and machined heat fillet has a radius of approximately 0.002 to 0.003-inch.

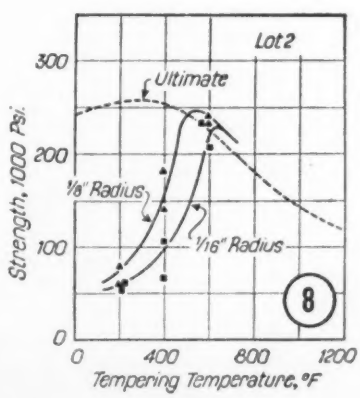
Results of the various series of tests are plotted in Figs. 3 to 10 against the tempering temperature. Ultimate strengths of the two lots of bolts, Fig. 3, differed slightly, as previously mentioned. A maximum ultimate strength of approximately 260,000 pounds per square inch was obtained by tempering at 200 to 400 degrees F.

Thread strength, Fig. 4, and notched strength, Fig. 3, in tests without shim, were almost identical for a given condition. This confirms the previously recognized fact that threads and compound notches behave much the same way as a single notch of the same contour and depth.

Thread Strength Higher—Throughout the whole range of the investigated strength levels, both thread strength and notch strength are 25 to 35 per cent higher than the ultimate strength. The notched section appears slightly stronger than the threaded section but this may be explained by various factors, such as differences in contour, in decarburization, etc. The absence of low strength values in these tests means that the threaded section of SAE 2330 steel







bolts is not susceptible to an embrittlement for any possible heat treatment or strength level if subjected to reguler tension with little or no eccentricity

However, if a shim is added under the nut, the bolts were found to possess a much lower strength than without a shim. In the series on threaded bolts, very irregular results were obtained and the thread stripped in all tests. This is rather peculiar, as for similar previous tests, results are reported which agree with previous results, and the present test on notched bars. No attempts were made to reveal the reason for the stripping of the thread in the present tests.

Thus, a shim under the nut or bolts provided with a notch close to the thread resulted in low notch strength values of the highest strength levels, being less than 40 per cent of the ultimate strength, Fig. 5. With increasing strength level the notch strength increased rapidly, and became practically the same as that of bars tested without shim if the strength level decreased to 225,000 pounds per square inch or less.

Susceptible to Embrittlement — Section under the head was found to be more susceptible to embrittlement than the thread, Fig. 6. In the as-quenched condition, all tests bars failed in a cup-like fashion, underneath the head, rather than through the generally weaker section through the thread. Also, if the section was reduced under the head, the as-quenched bars still failed under the head in a brittle fashion, rather than through the cylindrical section. This is interesting in that it proves that the embrittlement of the head is not primarily dependent upon the fiber as determined by the heading process but upon the notch effect of the head contour.

In order to obtain a thread failure for the as-quenched condition, the radius under the head was increased by machining off a part of the head, from a few thousandths of an inch to 1/16-inch, Fig. 1. Thus, such a stress relief radius increased considerably the strength of the section under the head, if the conditions are conducive to brittle failures.

Tests with a shim under the head also showed that the section under the head was more liable to embrittlement than the thread, Fig. 7. The head strength for the high strength levels, if tested with a shim, was as low as 20 per cent of the ultimate strength. Only when the strength level decreased to 160,000 pounds per square inch or lower did the head strength become identical for bolts tested with and without the shim, Fig. 10, the failure then occurring through the thread or in the reduced section.

Again, is was found that this embrittlement could be reduced materially by machining stress relief radii under the head, Fig. 8. But even a raduis of 1/8-inch did not eliminate completely the effect of the shim. However, it raised the range of strength levels which were not susceptible to brittle head breaks to approximately 240,000 pounds per square inch, Fig. 10.

The present investigation indicates a higher tendency towards embrittlement for the section under the head than for the threaded section. However, as clean thread breaks were not obtained in these with shims, and as the notch was some distance away from the shim, the actual properties of the threaded section were not revealed by these tests. Previous experimentation on some alloy steels, in which thread and notch breaks occurred close to the shim, yielded low strength values if the strength level was 160,000 pounds per square inch or higher, while in the present test low notch strength values were obtained only for strength levels above 220,000 pounds per square inch. It will therefore be attempted in further tests to clarify this discrepancy and to determine in a more accurate manner the respective sensitivity of the two sections to superimposed bending.

Among the conclusions reached are: In tension, with little or no superimposed bending, ductile breaks through the threads occur except in the as-quenched bolts. As-quenched bolts show brittle failures under the head at low and widely scattered loads, thus indicating greater notch sensitivity at this point than in the threads. Failures under the head can be prevented by adding a "stress relief" radius from shank to head. If necessary in practical cases, this may take the form of a semicircular groove having a radius of one-eighth to one-sixth of the shank. Superimposed bending at either head end or thread end causes brittle failures in these sections at considerably reduced loads.

From American Institute of Bolt, Nut and Rivet Manufacturers publication *Fasteners*, based on investigation of P. S. Cole, R. A. Roth and author.

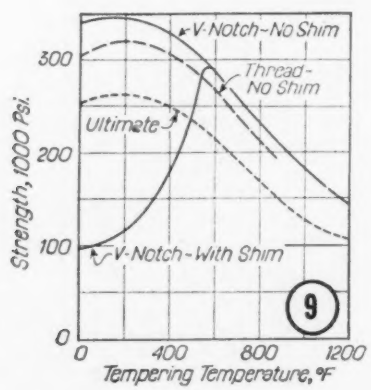


Fig. 9—Schematic sketch of results of various thread and notch tests

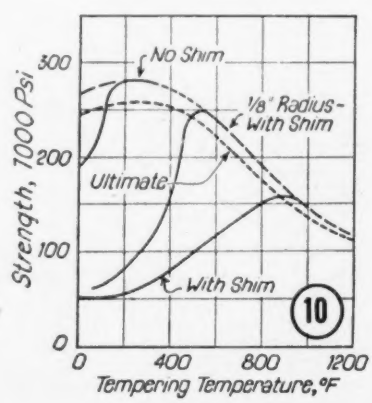
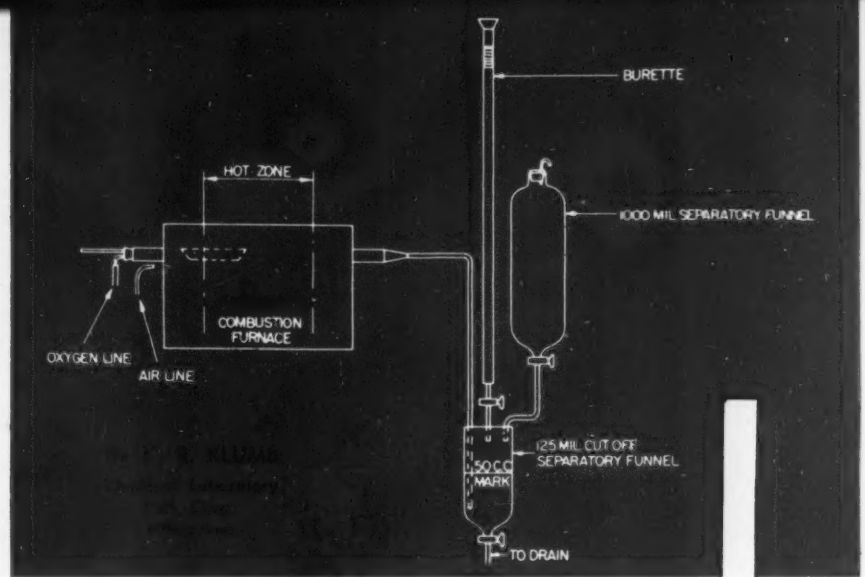
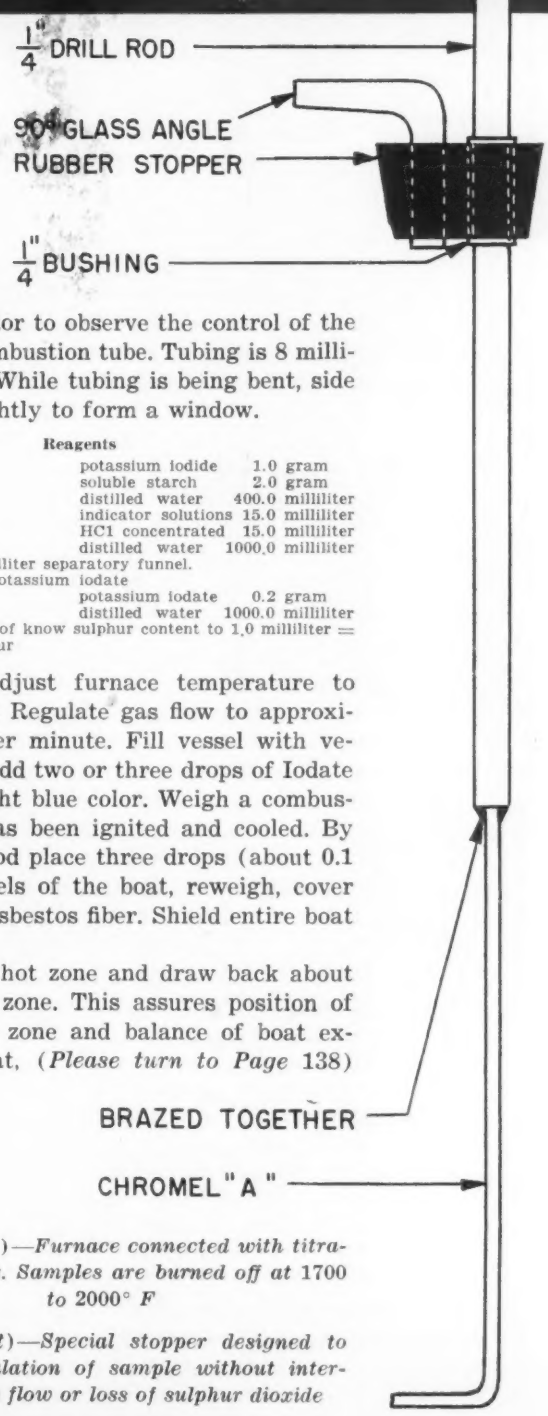


Fig. 10—Schematic sketch indicating results of various head tests

Sulphur in Fuel Oil

... determined rapidly by combustion method





VARIOUS methods have been developed for determining sulphur in oil. These time-consuming procedures require several steps of manipulation and special equipment. The following method was developed in connection with combustion sulphur on steel.

Technique in burning the sample prevents rapid combustion and spattering. Partial ignition takes place in the first step, allowing high volatiles to burn off with complete oxidation of carbon and sulphur. Residual carbon and sulphur burns off in the second step. Time for weighing and combustion of sample is 10 minutes.

Apparatus — A combustion furnace is used with a constricted tube 1 inch inside diameter by 1¼-inch outside diameter by 30 inches long using Nicrome wire or silicon carbide heating elements. High temperature (over 2000°F) is not necessary for combustion of oil. Figure 1 shows the furnace connected with the titration assembly. Samples are burned off at 1700 to 2000° F.

Titration assembly consists of a 50 milliliter burette, 1000 milliliter and a 60 milliliter open top separatory funnel. All pieces are held in place by suitable clamps extended from a burette stand.

Make a mark at 50 milliliters for solution volume. Drain is led to a receptacle below by rubber tubing.

Combustion gases are brought into the titrating vessel by 6 millimeter capillary glass tubing. Edges of glass tubing and combustion tube are butted and held in place by rubber tubing. This prevents combustion gas from contact with rubber. No. 6 combustion boats and covers are used to hold samples. Asbestos fibre, medium, washed and ignited is used to cover samples.

Special Stopper—Fig. 2 is a special stopper, designed to allow manipulation of the sample, without interrupting the gas flow or loss of sulphur dioxide. Close tolerance of drill bushing and drill rod makes a gas-tight fit. Drill rod should be about 8 inches long. Chromel wire is brazed to one end. Length of chromel rod is governed by distance sample has to be inserted into hot zone. A glass angle is made for a sight, enabling the operator to observe the control of the sample in the combustion tube. Tubing is 8 millimeter diameter. While tubing is being bent, side is blown out slightly to form a window.

Reagents

Indicator solution	potassium iodide	1.0 gram
	soluble starch	2.0 gram
	distilled water	400.0 milliliter
Vehicle solution	indicator solutions	15.0 milliliter
	HCl concentrated	15.0 milliliter
	distilled water	1000.0 milliliter

Pour into the 1000 milliliter separatory funnel.

Standard solution of potassium iodate

	potassium iodate	0.2 gram
	distilled water	1000.0 milliliter

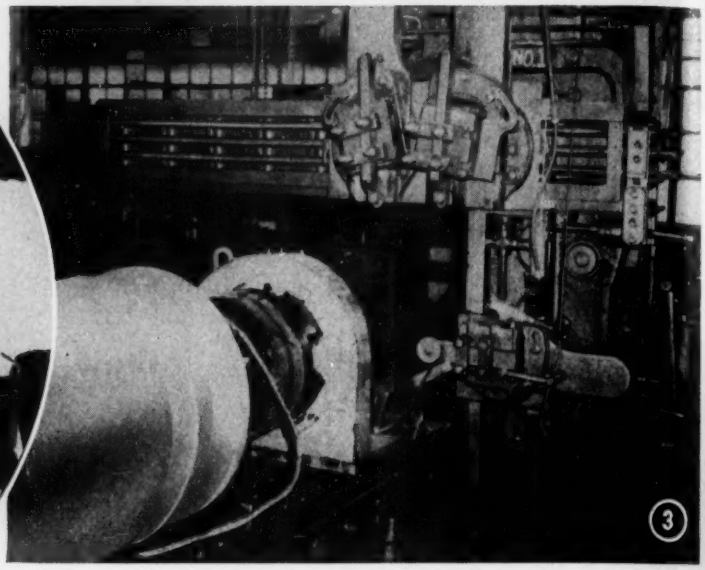
Standardize against oil of know sulphur content to 1.0 milliliter = 0.10 per cent sulphur

Procedure — Adjust furnace temperature to 1700 to 2000° F. Regulate gas flow to approximately 1 liter per minute. Fill vessel with vehicle solutions. Add two or three drops of Iodate solution for a light blue color. Weigh a combustion boat that has been ignited and cooled. By means of glass rod place three drops (about 0.1 gram) in the heels of the boat, reweigh, cover oil sample with asbestos fiber. Shield entire boat with a cover.

Run boat into hot zone and draw back about 1 inch into cold zone. This assures position of sample in cooler zone and balance of boat exposed to red heat, (*Please turn to Page* 138)

Fig. 1 (above)—Furnace connected with titration assembly. Samples are burned off at 1700 to 2000° F

Fig. 2 (right)—Special stopper designed to allow manipulation of sample without interrupting gas flow or loss of sulphur dioxide



"RAGGING"

40-inch Blooming Mill Rolls

GROOVING or "ragging" 40-inch blooming mill rolls is performed on a new roll rotating machine recently installed at Weirton Steel Co.'s Weirton, W. Va., plant. Designed by Virgil Jackson, foreman of the steel works machine shop, the tool frees the services of an overhead crane formerly required to turn or rotate roll on the planer bed.

When cutting, chatter is reduced, resulting in smoother grooves. Time per roll is reduced to about 1¼-hour, a saving of 75 per cent over the old method.

Fig. 1 shows roll rotating unit being set in place. Full view of the device and cutter in position is shown in Fig. 2. In Fig. 3, a groove is cut. Steel radius tool can be adjusted on the circumference without having to remove tool each time for regrinding. Cutter is always stationary on center while roll is rotated.

ASTE Exhibition To Show Electronic Counter

An electronic instrument which accurately counts and records pieces produced by any electric motor driven machine which places a distinct load on the motor for each piece produced will be displayed in operation at the forthcoming American Society of Tool Engineers industrial exposition to be held in Cleveland in March. The counter, made by the Electronics Division of Lansing Engineering Co., Lansing, Mich., utilizes no mechanical linkages in the installation.

Obtaining its actuation from the current load on the motor of the producing machine, a signal directly proportional to the current load on this motor is transferred to the instrument's control box through a current transformer connected to the motor circuit. This signal is applied to one side of an adjustable balanced electrical circuit which, because of its reportedly great sensitivity, will be thrown out of balance only when actual work is being performed. The out-of-balance condition causes a trigger tube to fire actuating the recorder which prints each count thus obtained.

Adjustable delay circuits make necessary the continuance of the current load drawn by the working cycle for a predetermined period of time before a count is obtained. Where there are several different operations on one piece, each with a distinct current load, adjustments may be made to give one count for the total of the operations. A permanent tape recorder used in conjunction with the counter, itself called the Lectro-Count, prints on standard adding machine tape the date, time to the minute and count for each piece produced.

Film Details Cost Cutting by Arc Welding

How the increased use of electric arc welding in industry can reduce manufacturing costs and produce better products is shown in a new all-color, sound motion picture, "Arc Welding at Work", produced by General Electric Co., Schenectady, N. Y., as part of its More Power to America program. Featured are 53 electric welding applications photographed in the plants of metal fabricators and manufacturers.

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Battery of Five 42" Mesta High Speed Electrolytic Cleaning Lines . . . .

Assure Suitable Stock for the Electrolytic Tinning Operation.

DESIGNERS AND BUILDERS OF COMPLETE STEEL PLANTS

MESTA MACHINE COMPANY · PITTSBURGH, PA.

Welding Stainless Steel Tanks

. . . without distortion or buckling

BOTH distortion and buckling were eliminated in welding a stainless steel tank for a brewing company by National Tank Mfg. Co. of Los Angeles. The tank, measuring approximately 46 x 20 ft with an additional section of 13 x 14 ft, was built to specifications submitted by the brewery.

First "spec" called for stainless steel type 302 of the lightest possible gage to permit fabrication without distortion or buckling. Secondly, it specified butt-welded joints, with each weld being not more than 1/16-in. above the surface. Thirdly, allowance for expansion was to be made since liquids would be poured into the tank at a temperature of 212° F. A fourth requirement called for air space underneath the tank to facilitate rapid cooling. Design of the tank had to be flat with a 5-in. slope from end to end to permit drainage. Lastly, a maximum allowable distortion of no more than 3/16-in. was required in flatness for the bottom of the tank.

It was determined that the lightest possible plate which could be used would be approximately 10-gage, inasmuch as the tank would be supported by concrete foundations, with air space underneath. Because of the nature of the stainless steel and the existence of considerable cold work stresses, it was necessary to tack it to some form of backing to hold it in place for welding. This was accomplished by imbedding bolts into the concrete, the thread end up and attached to 2 x 2 in. angles so that adjustments could be made after the concrete had been poured. The angles were placed on 12-inch centers which, while perhaps more stiffening than was actually required, was sufficient to take care of any severe buckling that might occur.

Plates were kept cold during tacking in order to combat the creeping tendency. Blocks of dry ice were placed over the tack which was made from the bottom side of the tank in an overhead position, using a Stainweld 7 in. electrode.

This method of erection would indicate that lock-up stresses were going to be present during the welding operation and that some buckling could be expected due to the end shortening of the longitudinal and transverse seams. However, none occurred. After all the plates had been tacked into position, 10-gage by 2-in. back-up strips were tacked onto the longitudinal and transerse joints. Tacking and fitting required 75 manhours.

After the plates were fitted and tacked down with a 1/16-in. gap at the joint, Lincolnweld automatic metallic arc process developed by Lincoln Electric Co., Cleveland, was used. Transverse joint X, shown in the illustration was welded first with 400 to 450 amp, 30 v and with a 5/32-in. rod, using a travel speed of 86 ipm. Transverse joint Y was welded next with W and Z following in that order.

Following the welding of all transverse joints, longitudinal joints P, Q and R were welded in that order and in the direction as indicated in the photograph. In order to avoid difficulty at the corner marked XX, the rim was welded as follows: Starting from point H welding was in the direction as indicated around to point I and again coming back to point H the seam was welded around to the opposite side of point I.

Approximately 3 hours were required to complete all butt weld and lap joints. No buckling at all resulted from the welding, but improper plate preparation produced a few slight buckles which were removed by spot shrinking using a water quench.

Michigan WELDED STEEL TUBING

The Modern Electric Resistance Welded Steel Tube

ROUND
¼" to 4" O.D. 9 to 22 gauge

SQUARE • RECTANGULAR
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Michigan Welded Steel Tubing is available in sizes and shapes that make it readily usable in the production of a wide variety of parts.

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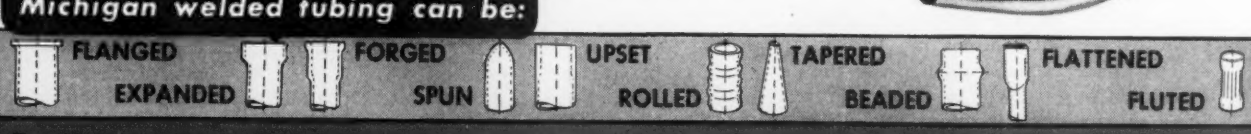
Michigan welded tubing can be:



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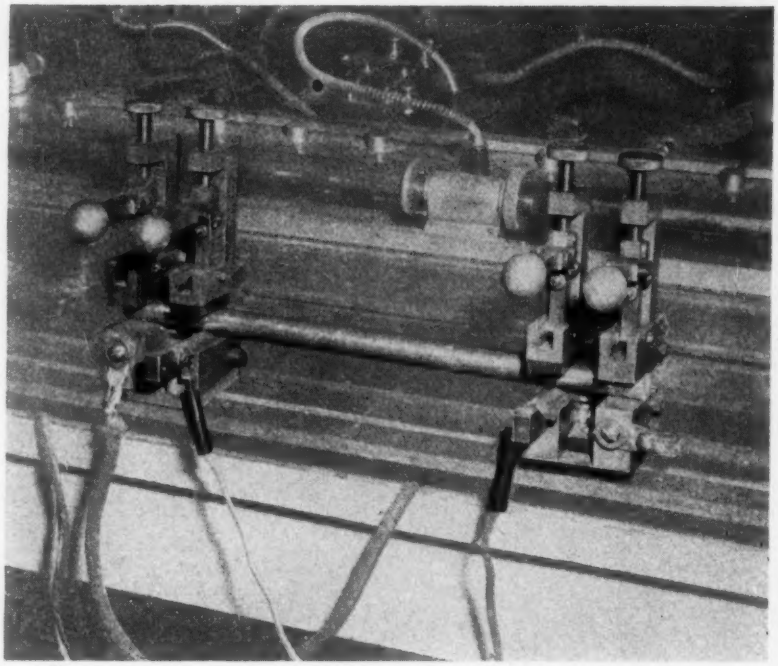


Electrical Conductivity Tests

... facilitated by improved fixture

APPLICATION of fixture design principles to laboratory apparatus has facilitated the control of aluminum for casting rotors. At General Electric's Fort Wayne works, rotors for small induction motors are pressure cast of aluminum. Control of the conductivity of aluminum is an important factor in the manufacture of high quality motors.

According to W. R. Hunt of the works laboratory, the large quantity of motors manufactured makes the control of aluminum itself quite a job. To minimize the time consumed in checking conductivity, the works laboratory developed a more expedient fixture to be used with standard Kelvin bridge equipment.

Fixture itself is electrically similar to the older design. It consists of two current carrying clamps at the outside ends and two knife edge potential clamps between them. A fairly heavy current is applied through the current clamps, and the potential is measured at the knife edges. Inasmuch as the distance between the knife edges is the critical measurement, as far as resistance tests are concerned, the fixture can be arranged so that the distance can be read directly on an attached scale. On the models in use, however, this distance is measured with a steel scale.

Major improvement the fixture offers lies in the application of good fixture design. Toggle clamps with large knobs for handles replace the usual small thumb screws on the clamp. They may be adjusted to the dimension of the standard test bars by the knurled hand screws on top; then it is only necessary to pull down the four handles in order to clamp any standard test bar for test. For different lengths of bars, one or both of the potential current clamp units may be moved in the slotted board by loosening a thumb screw under the board.

Single-Phase Motor Starts Heavy Loads

Improved starting torque characteristics reportedly make a recently developed capacitor-start, single phase induction motor applicable to such tough starting assignments as compressors. Developed by Westinghouse Electric Corp., Pittsburgh, the new squirrel-cage motor, although it has a lower break-away torque than other types, can bring up to full speeds loads which will cause the other types to start, it is stated.

With high torque valves all the way up from standstill to full speed compressors can be driven by the simplest form of induction motor—the die cast, squirrel cage type—the company asserts, with the added advantage that the capacitor-start motor is electrically reversible and its characteristics fixed. A centrifugal switch is used on motors rated from 1 to 3 horsepower at 1750 revolutions per minute and 1½ to 5 horsepower at 3600 revolutions per minute.

This switch consists of a rotating governor on the shaft which actuates a set of contacts in one of the end brackets. The relay is a multiple unit which is said to provide protection against undesirable dynamic braking when the motor is de-energized. Capacitors are mounted in the conduit box which provides a lower ambient temperature, this permitting the motor to withstand greater abuse in starting. Addition of a thermostat provides additional motor protection.

Heat treatment of all single phase motor rotors after assembly burns off the punching burrs which provide short circuit paths for eddy currents, as well as annealing the outer portion of the core. According to the manufacturer, the net result is not only an improvement of 2 or 3 per cent in efficiency and a 20 to 25 per cent reduction in the cusp of the speed-torque curve, but also greater uniformity of performance.

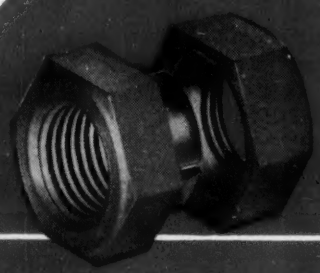
High Production Shear Mills To Be Exhibited

High production face milling of cylinder blocks, heads, gear cases and other frail iron castings is possible with the Tri-Bit Super shear mill, according to Weddell Tools Inc., Rochester, N. Y., their manufacturer, who will exhibit them, along with their line of inserted blade metal cutting tools and accessories at the American Society of Tool Engineers industrial exposition in Cleveland, March 15 to 19. Also to be shown are tools incorporating the company's solid carbide 3/8-inch Tri-Bit, a small triangular tool bit which has been applied to small solid shank end mills, shell type face mills and small slotting cutters.

Self-locking LOCK NUTS

that WON'T shake loose

THESE 4 TYPES FIT EVERY FASTENING PROBLEM



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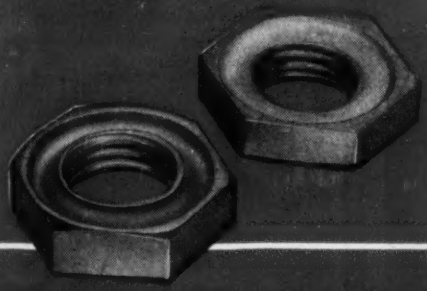

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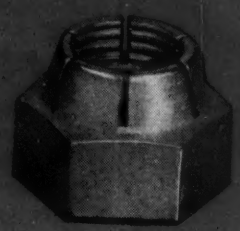
To withstand Shear only. For applications requiring a thin, one-piece, light weight locking nut, and where strains would be in shear only.



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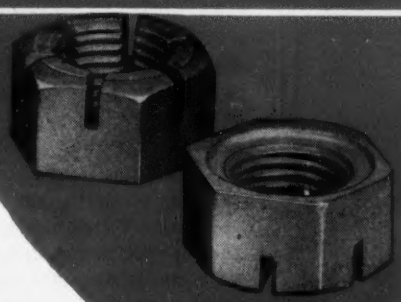
To withstand Shock-loading or Vibration—even under heat, oil or moisture. One-piece, easily installed, grips the bolt threads and maintains locking effect whether seated or not. Preset torque values, built in, insure vibration-proof results.



NATIONAL "MARSDEN" LOCK NUTS

For effective locking at Minimum Cost. One-piece, cantilever action type. Easily applied, free running until seated. Can be re-used with same locking efficiency.

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To help you select the right Lock Nut for your assembly, write today for this useful Lock Nut Booklet which gives you complete data on the engineering, design, weight and cost of these 4 "National" Lock Nuts.

THE NATIONAL SCREW & MFG. COMPANY, CLEVELAND 4, OHIO

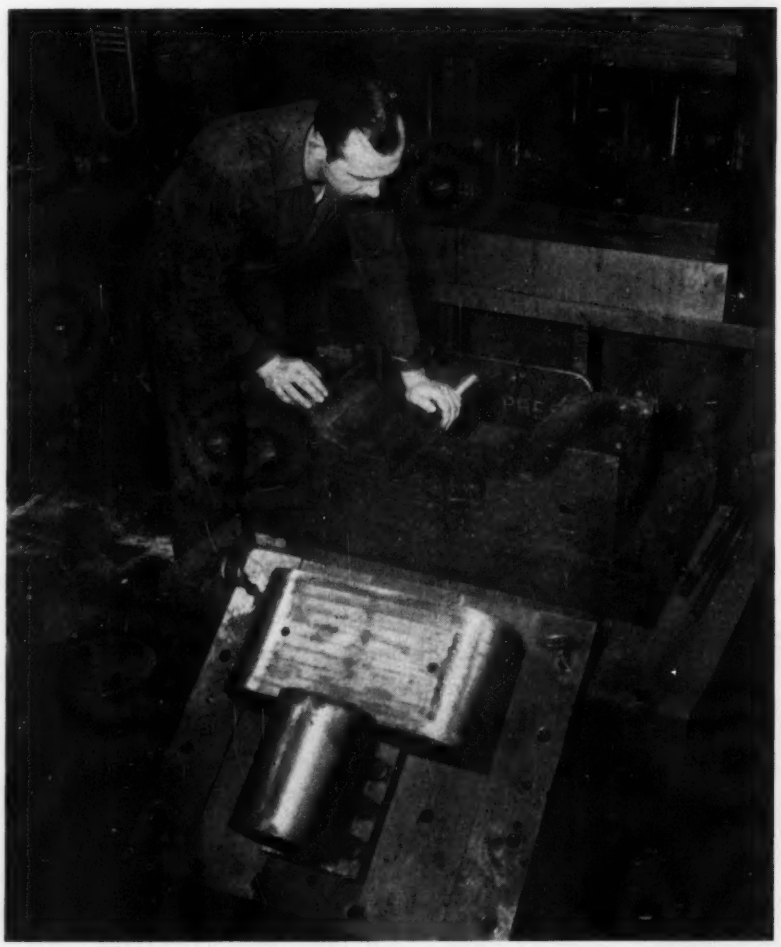
steel mill duplicates that of rope wire steel except for rolling temperature.

In filling an order for 0.055-inch bright music spring wire, the 0.207-inch rods are air patented, cleaned, and baked. Next they undergo two passes on a single block drawing machine to 0.160-inch. Another patenting takes place—on the electric equipment with a lead quench which produces a tensile strength of 200-210,000 pounds per square inch; then another cleaning and baking.

There follows application of a metallic lubricant to improve surface conditions through the succeeding passes this wire undergoes on a continuous water-cooled drawing machine before it emerges as an 0.055-inch bright music spring wire with a tensile range of 315,000-345,000 pounds per square inch. A good amount of the metallic lubricant is retained on the finished wire, aiding its coiling.

Samples are cut from both ends of every coil of music spring wire, carefully "miked" and subjected to tests for torsion, tensile, dead cast, breaking, strength, severe crimp, and coiling (ASTM standard specification A-228-41).

To retain the lustrous finish on this wire during shipment and storage, it is dipped in mineral oil, wrapped in cellophane, then rewrapped in a double thickness of high grade bundling paper.



DIE LIFE INCREASED, COST CUT: Laminated fabrication of the larger element of this two-operation bending die enabled engineers of Lincoln Electric Co., Cleveland, to double its life while cutting production cost by 60 per cent. Die, used on a 500-ton press built by Hydraulic Press Mfg. Co., Mt. Gilead, O., bends ends of strips of 11/16-inch plate, then closes strip into ring form for welding as exciter frames. Pending element was built up by welding a number of 1-inch plate sections together which were flame cut to contour to produce both male and female halves in a single operation

Cold Heading Stock — Industrial wire specialization is not restricted to high carbon types. Efficient practices have been developed and a fine volume of tonnage sold in cold heading wire. Eight different standard heats of steel are available for individual specifications of cold heading stock. In filling orders for 0.044-inch copper-coated, tubular rivet wire, annealed in process, for extruded point rivets, a heat is produced meeting the following chemical analysis:

C	Mn	P	S	Si	Cu
.05-.07	.20-.30	.02	.04	Low	.15 Max

Processing this heat through the steel mill differs from high carbon types. In the first place, it is a rimmed steel; no hot tops are added to the ingot molds; the molds are capped. Temperature of the steel in the soaking pit and during the rolling operations also differs.

When rod enters the guide pipes after leaving the last stand in the rod mill, those pipes are filled with water, controlled to regulate the finishing temperature and the degree of scale on these rods.

In the wire mill the rods are cleaned in a vat containing an agitated concentration of from 8 to 9 per cent sulphuric acid maintained at a temperature of approximately 160° F. Following a 30-minute immersion in this acid solution, the rods are hosed with cold water, dipped in a tub of lime, and baked for 60 minutes. Drawing of this particular wire to 0.054-inch diameter follows, on a continuous drawing machine. The approach angle and bearing of dies drawing this wire is different from those used in high carbon wire drawing. A lubricant composed of lime and a special compound is mixed for drawing cold heading wire.

During the continuous drawing, tensile strength of this wire has jumped. To reduce it to the customer's specified tensile strength and to equalize the stress developed during drawing, the wire is muffle-annealed for 3 hours until it is completely spheroidized.

Wire is then cleaned once more and passed through a copper sulphate solution. A water rinse follows and then wet drawing to 0.044-inch, its specified diameter. Lubricant in this operation is one especially developed.

Wire for cold heading stock, for cable, for fine springs are not this mill's only industrial wire specialties. They are also used for tire bead, for flexible shaft, and for other special types of wire for industrial purposes.

Step Up Sheet Output—*Continued from Page* 102

intensities of x-rays from the two sources hitting the pick-up is registered on the indicator instrument. At full deflection of the indicator needle a red light on the instrument goes on and a throw-out or other mechanism is actuated through electronic circuits. A simplified schematic drawing of the gage is shown in Fig. 2. Since the sample and test sheet are of the same material and the x-radiation from two sources is maintained at constant intensity, the transmitted radiation depends only on the thickness of the material being gaged.

Low-Power X-Ray — Pick-up device is made up of a photomultiplier tube surrounded by a fluorescent screen and enclosed in a light-proof cover. A photomultiplier tube is a phototube with a built-in electron amplifier. Absorption of x-radiation in the fluorescent screen excites the compound of the screen to visible luminescence which is picked up by the photoelectric cell and converted into current pulses. The latter vary in amplitude according to the thickness of the material. Tremendous amplification of the photomultiplier permits the use of comparatively low-powered x-ray generators.

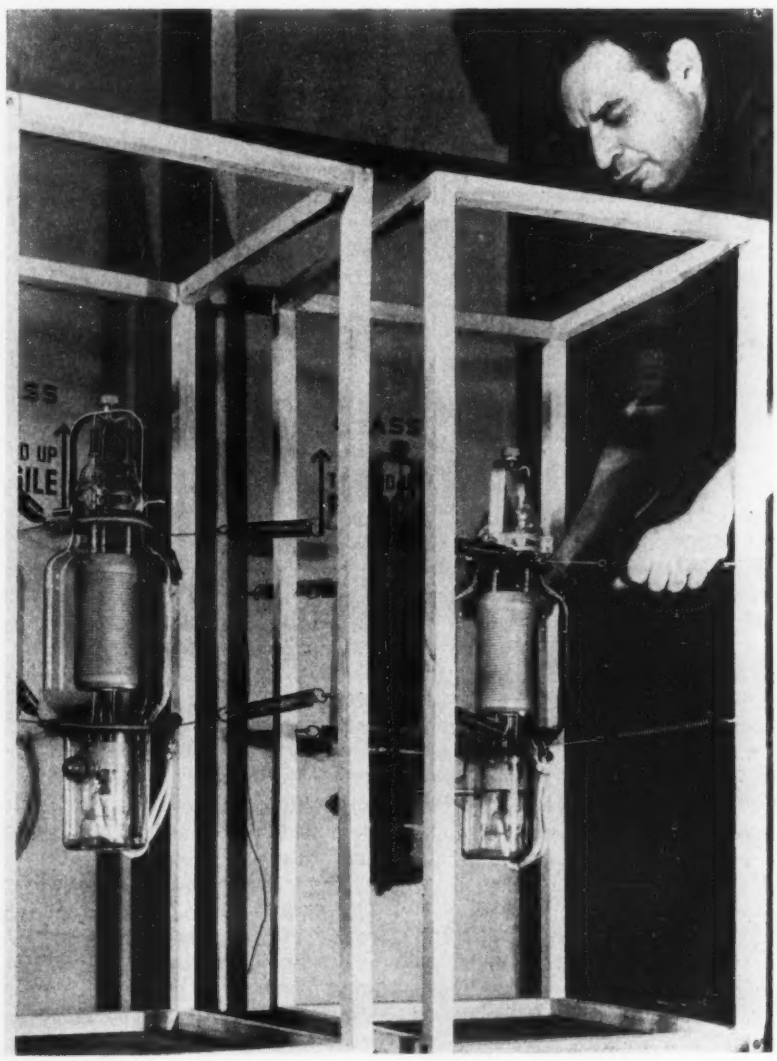
In this gage the x-ray generators are enclosed in rugged cast housings. Tube, filament transformer for the x-ray tube, and necessary high tension transformer are immersed in oil and enclosed within the cast housing. Necessary primary leads are brought out through a waterproof socket. The x-ray generator is a self-contained unit, and no high tension leads or cables are required. Since both x-ray generators are operated at only a fraction of their normal rating, natural air flow is sufficient for cooling.

Mounted On Roving Carriage — Two x-ray generators and pick-up unit are mounted as one assembly as shown in Fig. 3. Upper x-ray beam is interrupted by the standard sample held in a slide device. Pass line of the cold mill or flying shear is maintained between the pick-up unit and the lower x-ray source. Two heavy guide plates prevent whip or cobbles from injuring either x-ray generator or pick-up. Usually this assembly is mounted on a heavy fabricated slide or truck that can be moved laterally across the strip or removed entirely from the pass line. The instrument scans about 1 square inch and can be mounted to rove across the sheet.

A main control cabinet contains all the electronic and auxiliary equipment for complete operation of the unit. Circuits are separated into basic elements and mounted on separate chassis with plug and cable interconnections between chassis. Chassis are mounted in rack style and hinged to the main door of this cabinet. With this system of mounting, service and maintenance is comparatively simple.

All controls necessary for the normal operation of the gage are located on the remote control panel. Under normal conditions the setting up procedure is a simple, logical operation that regular factory workmen can easily handle.

Thickness indicator unit is a 6-inch switchboard-type instrument with an illuminated zero center scale, as shown in the upper background of Fig. 4. There are two scales on the instrument; one reading 0.002 full scale and the other 0.001. The desired scale may be selected from a switch on the remote control panel. Above this instrument are three pilot lights, the center one with a green crystal and the two outer ones with red crystals. When the test sheet is within tolerance the green light remains lit. If the material goes off tolerance one of the two outer red lights will be illuminated, depending upon whether the material has gone off positive or negative. These lights



PACKAGING WRINKLE: Much of the breakage formerly experienced during shipping of large transmitting tubes is eliminated with the simple new packaging method developed by Amperex Electronic Corp., Brooklyn, N. Y. Shipping room operator is shown making final adjustments on the spring mounting used in suspending the tubes in rigid wooden frames which fit into corrugated cartons

operate in conjunction with an electronic reject circuit which operates the throw-out gate in the flying shear or the screws on the back-up rolls of a mill. This instrument should be mounted where it can be seen conveniently by all operating personnel concerned.

Controls Copper Mill—In addition to the steel sheet gage mentioned previously, one of the instruments is now in operation in a copper mill. Inserted between a one-stand cold reduction mill and its take-up mandrel it operates an automatic control of the screw-downs. Mounted on a sliding truck the gage can scan at any lateral position across the copper strip as shown in Fig. 4.

Danger to Personnel Eliminated—During the initial stages of x-ray gaging considerable apprehension was noted concerning the danger of x-radiation to personnel. When x-rays strike any material a certain portion is absorbed in the material and another portion is transmitted through the material. A secondary effect is that of an indiscriminate scattering of a softer radiation from the piece being irradiated. This scatter radiation can be of an intensity great enough to do considerable injury to body tissue. Decline in intensity of x-radiation both primary and secondary follows the inverse square law. Detrimental effect of x-radiation upon human tissue is a function of both the intensity of the incident radiation and exposure time. With these factors in mind any x-ray equipment can be made safe. The intensity of scatter radiation is determined by the material and also by the wave length of the primary radiation.

In the x-ray thickness gage, designed for cold mill applications, the intensity of scatter radiation at a point 5 inches from the irradiated sheet is lower than the maximum dosage rate as given by the American Standard Association. As the thickness of the material is increased and the intensity of primary radiation is in turn increased, scatter radiation becomes a somewhat more difficult problem. However, with the effective use of baffles and other protective equipment this danger is eliminated. As is the case with any x-ray equipment, the degree of protection utilized should be proportional to the power of the generation equipment. A well-designed x-ray thickness gage is not dangerous to personnel that may be working in the area.

25 PER CENT LOWER PRODUCTION COSTS COULD

Widen Market for Stainless Wire

By J. K. FINDLEY
Metallurgical Engineer
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UNTIL recently, stainless wire has not been very much in the general public eye except in form of wire rope on yachts and shelves in refrigeration. Its other uses were principally confined to articles demanding good corrosion and heat resistance yet were not readily noticeable to most people. Such uses as runners on tank type vacuum cleaners, shanks on kitchen tools, insect cloth, and wire for wire recorders have added greatly to the publicity of this type of wire.

During the past few months and for an unpredictable period to come, the new wire recorders will account for the largest consumption of the chrome-nickel type in the very fine size range. These recorders are just now getting on the market in fair quantity and it is a little early in the game to predict the future volume of sales and whether or not the present type of stainless wire used on these machines will meet future requirements as to cost and quality. At present, it has better qualities for this purpose than other types of wire but considerable effort must be exercised to maintain control of the magnetic properties.

There are many applications that would make a real tonnage market for stainless wire if its cost of manufacture could be reduced approximately 25 per cent. Slower drawing speeds and shorter wire drawing die life encountered in manufacture of this type of wire have so far balked attempts to lower costs materially; however, these problems that at one time were accepted as almost insurmountable are being reviewed and tackled with more optimism.

Oxyhydrogen Welding of Aluminum Reported

Use of oxyhydrogen rather than oxyacetylene welding, welding of aluminum containers and the use of a new aluminum alloy known as K. S. Seewasser are covered in a British report on German aluminum practice, offered by Office of Technical Services, Department of Commerce, Washington 25, D. C. The new alloy was used in the production of mine shells and contained 2 per cent magnesium and 1½ per cent manganese. Used in a soft condition, the alloy, which requires a specialized technique of working (described in the report), has a tensile strength of about 15 tons per square inch.

Gas welding was normally used for all important joints of aluminum containers used for the transport of gasoline, nitric acid and hydrogen peroxide. Three of the six fabricating firms used oxyhydrogen welding in preference to oxyacetylene because it was considered that the former process gives sounder welds and because the flame was easier to manipulate and therefore more suited for inexperienced workers, the report stated. Two other firms preferred this process because the cost was lower.

Physical composition of the coating of aluminum electrodes made by a German firm is detailed. The firm made a range of dipped electrodes for welding pure aluminum and alloys, including K. S. Seewasser. In all cases the core wire was of the same composition as the material to be welded.

The report, designated as PB-34016, is entitled "Welding of Aluminum and Aluminum Alloys with Reference to Manufacture of Pressure Vessels".

Safety Code for Refrigeration Revised

Provisions for the safe use and application of mechanical refrigeration are being prepared by a committee working under American Society of Refrigerating Engineers leadership. The committee was reorganized by the American Standards Association to revise the 1939 American standard safety code for mechanical refrigeration. To put the code in a form most easily used by municipal and state authorities and to bring it up-to-date so that its safety requirements will be applicable to all new types of refrigeration equipment are the purposes of the revision.

Doubles Capacity

(*Concluded from Page* 103)

from one end of a floor to the other.

At a central point directly off the main shipping warehouse a large spiral gravity conveyor had been installed which carries the packaged products from any of the floor levels directly to the warehouse. The lift trucks are employed to rush the finished product to the conveyor and gravity delivers them to the shipper's hands.

Once in the warehouse, the kegs or boxes are placed on wooden pallets and a lift truck takes over once again. If carload orders are being assembled, the lift trucks can pile the palleted units in high stacks in any part of the warehouse. In floor space normally consumed by 18 kegs, as many as 54 kegs can now be stacked. By the old hand methods of handling with push trucks only one keg or at the most two could be moved at one time by a man. Stacking two high was about as much as any man could achieve.

With fork trucks handling palleted kegs, often two pallets containing a total of up to 18 kegs can be moved rapidly to any point and piled as high as 12 feet from the floor. It was expected that warehouse capacity would be doubled by palletizing and utilizing high stacks but as you can see from these figures, capacity is actually three times or more as great.

The lift truck serves a thousand uses in addition to increasing warehouse utility. Loading docks are door high, permitting lift trucks to run directly into box cars with palletized loads for shipment. The same is true of incoming shipments which must be unloaded.

They also make up a speedy distribution system throughout the many floors and levels of the plant for movement of supplies as well as finished product. Part of the original consideration of taking space in parts of other departments for warehousing has been applied because lift trucks and palletizing made it possible.

In this way, any waste areas within reasonable distance of the shipping warehouse, no matter how small, can be utilized to stack high piles of products or supplies and the ever-handy lift trucks are always on tap to whisk the material to wherever it is needed.

Many export orders were held-up because of an embargo, and the material was stored in every nook and cranny of the plant for sometime without disturbing production or jamming the shipping warehouse. Odd corners of plants which sometimes become waste space as a result of equipment changes through the years now serve for storage.

—o—

Basic principles required for solution and understanding of most vibration problems are covered in a new book, "Elementary Mechanical Vibrations," written by Austin H. Church, professor of machine design and chairman of Department of Mechanical Engineering of New York University. Included are chapters on undamped free and undamped forced vibrations, damped free and damped forced vibrations, equivalent torsional systems, multimass torsional and lateral systems and balancing.

Torque and Thrust Measurement AID BEARING TESTING

DEVELOPMENT of sleeve type bearings and bushings with greater load carrying capacity and longer life is requiring sensitive measuring instruments to measure output torque on test stands to determine comparative life of bearings. Such an instrument is the Thrustorq which uses compressed air to measure both torque and thrust. According to its manufacturer, Hagan Corp., Pittsburgh, it is so sensitive and accurate that it will measure the reactive force of a single turbine blade or the thrust of a giant jet engine.

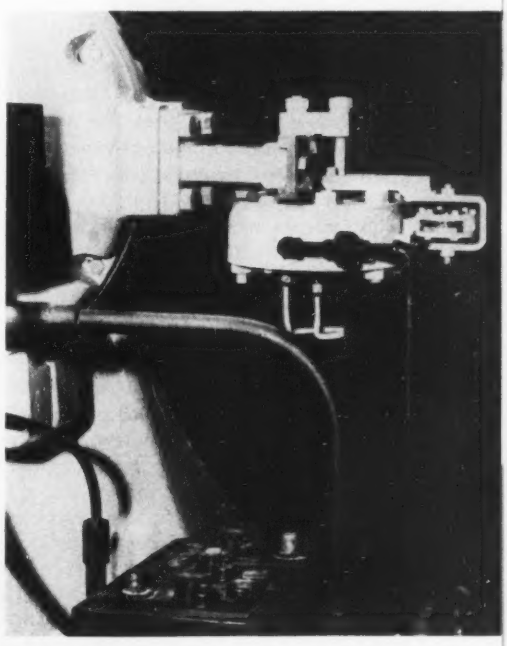
Heart of the device, now being used in the laboratories of Cleveland Graphite Bronze Co., Cleveland, is a flexible diaphragm which forms one face of an air tight chamber to which compressed air is admitted through a poppet valve. Force to be measured is applied to the outside of the diaphragm and is opposed by internal pressure.

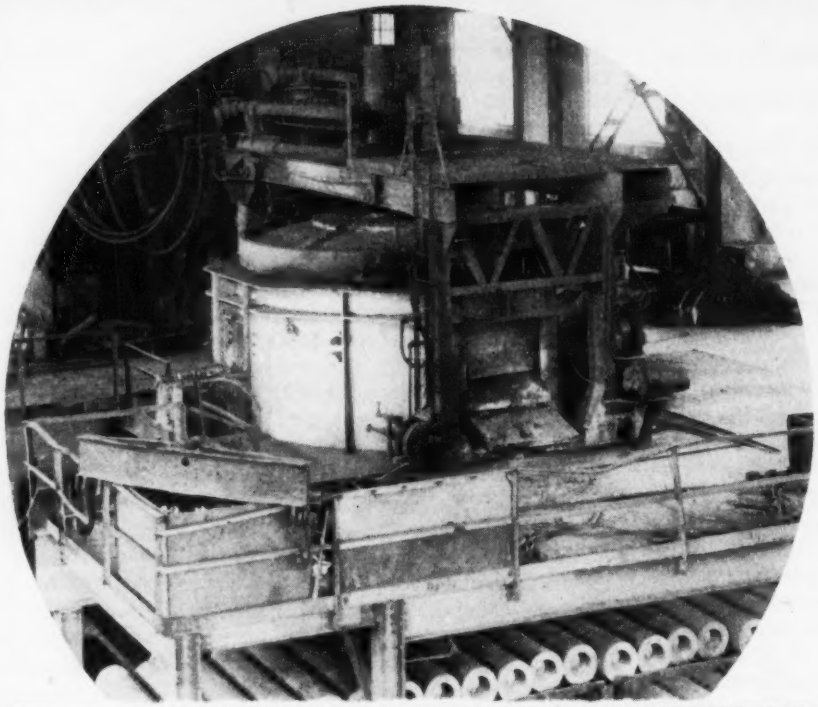
In the laboratories of the bearing firm, engines are operated at high speeds, elevated temperatures and heavy loads for thousands of hours until bearing failure occurs. The Thrustorq, installed on the dynamometer, is used to measure the engine loading. These tests cover a wide range of load and speed conditions. Bearing loads of 1800 pounds per square inch of bearing surface—considered satisfactory several years ago —now are said to have gone to 3000 pounds, and the company is working to build that strength to 6000 pounds per square inch.

Conductivity of special test samples of other shapes and sizes can be measured by adjusting the knurled hand screws at the top. Round bars up to 1¼-inch diameter and rectangular bars 1¼ x 1½-inch can be tested. The current clamps are made of copper to insure low contact resistance.

Knife edges are made of hardened beryllium copper to cut through the skin of sample and form a point contact for accurate measurements, and are hard enough to allow resistance measurements of metals up to and as hard as most ordinary brasses, bronzes, and aluminum alloys.

The accompanying illustration shows the conductivity test fixture in the foreground with an aluminum sample bar in place for measurement. In the background are the circuit components of the Kelvin bridge.





Oxygen is proving a valuable medium in electric furnace practice for eliminating carbon

By W. B. ARNESS
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Metallurgical Consultant
A. M. Byers Co.
Pittsburgh

ELIMINATING CARBON WITH OXYGEN

. . . in commercial grades of electric furnace steel

Factual summary of results obtained at Ambridge, Pa. plant of A. M. Byers Co. through use of oxygen for eliminating carbon in about 1200 forty-ton heats of commercial quality electric furnace steel. Results were so satisfactory that oxygen now is largely used to supplant ore and other oxidizing materials

AS early as 1933 the writer was interested in oxygen for carbon elimination, but a few trials with bottled oxygen at the then prevailing high price demonstrated the inadequacy of equipment and an uneconomic high cost. Since then the practicability of oxygen for this use has been periodically under review but it was only about one year ago that the subject began to receive industry-wide attention. Company management was alert to this development from its inception and encouraged exploratory efforts to appraise its effect on quality of product and its adaptability to the company's relatively new electric furnace installation.

With this favorable background of managerial support and early experience it was possible to glean sufficient data from the somewhat optimistic and conflicting reports then current and to assemble enough equipment to move rapidly from experimental to production use of oxygen. This development promises worthwhile improvement in both quality and costs.

Practice Prior to Oxygen Use — The two furnaces at the Byers plant are American Bridge Co., gantry (top charge) type, 15 feet diameter. For melting commercial steels they will produce about 42 net tons of ingots per heat, which is capacity for auxiliary equipment. This report is confined to a discussion of oxygen use in making commercial steels, both single and double slag. Most were low-carbon steels and all were relatively low in alloy content.

For commercial reasons, furnace charges are made up largely of mixed scrap, much of which under present conditions is quite bulky, so that recharges average about 2-1/2 per heat. Occasionally this scrap is considerably oxidized and it may vary widely in carbon content. When available, some wrought iron is used, and generally the charges include 4000 to 5000 pounds of mold scrap.

It was standard practice to add about 35 pounds of ore, scarfing scale or other oxidizer, per ton of charge. This as well as estimated sufficient lime to oxidize phosphorus and to produce a basic slag at meltdown, was added early.

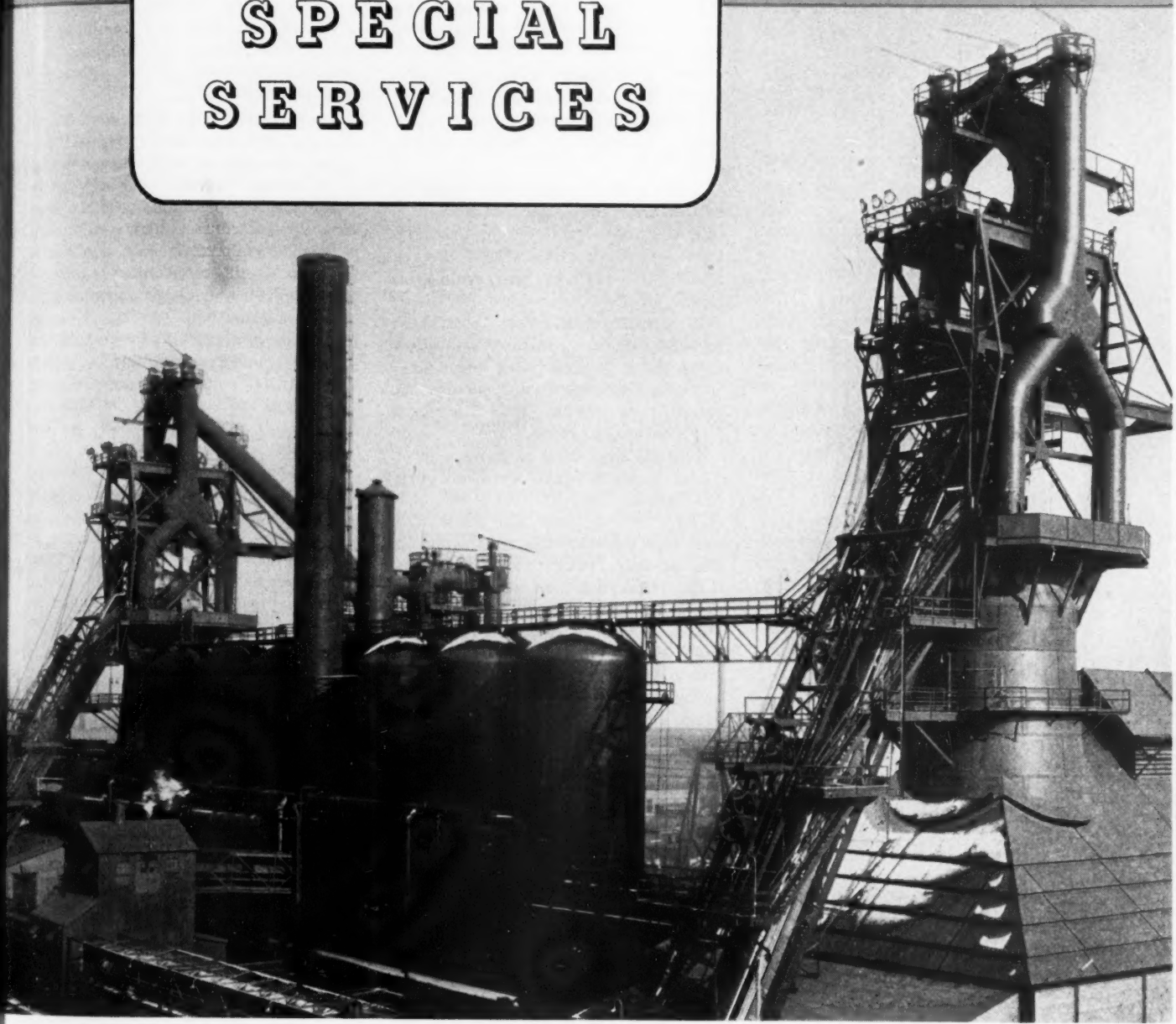
This charge was planned to melt about 0.25 per cent carbon for oxidation to 0.10 per cent carbon or under. Due to nonuniformity of scrap and other causes, an occasional heat would melt flat and many melted between 0.40 to 0.70 per cent carbon; a few were 1.0 per cent carbon or higher when melted. Although these high-carbon melts prolonged the heats and were therefore undesirable, increasing the charge ore sufficiently to eliminate them tended to cause too many flat melts.

Carbon eliminated with ore after meltdown consumed 75 to 100 pounds of ore per point of carbon. Rate of elimination varied considerably but seemed to average a little under one point per minute. To this should be added time required to warm up the heat after meltdown and whatever time is allowed for the bath to reach equilibrium after the last ore addition.

FeO in the slag (total iron as FeO) varied between 20 and 38 per cent

MBER **14** IN A SERIES OUTLINING McKEE SERVICES TO THE IRON AND STEEL INDUSTRY IN RECENT YEARS

SPECIAL SERVICES



IN addition to engineering complete new plants the McKee organization has supplied special services on numerous individual problems in recent years.

Miscellaneous contracts involved rehabilitation, remodeling and modernization of existing facilities to accommodate changes in operating practice, to reduce operating cost, or to increase production.

McKee experience in engineering complete new plants was advantageously applied to revamping furnace filling equipment, gas cleaning facilities, material handling facilities, and cast houses—modernizing steam and power facilities—and general blast-furnace and stove repairs.

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with carbon below 0.10 per cent.

Manganese at meltdown varied widely but generally was between 0.20 and 0.35 per cent, depending somewhat on carbon content. It usually dropped to 0.10 per cent or less at the end of carbon oxidation.

Sulphurs were variable, usually melting between 0.025 and 0.040 per cent, but occasionally as high as 0.09 per cent. A considerable amount of work and furnace time was required to reduce sulphur content in some heats.

Method of Using — Oxygen was first tried on a strictly tentative basis, using the compressed gas at 2300 pounds per square inch. This pressure was stepped down through a high capacity master regulator to about 150 pounds per square inch. The gas was piped to the furnace at this pressure and stepped down there to desired lance or injection pressure by means of a quick shutoff valve.

In planning use of oxygen it was necessary to consider how gas consumption could be measured and overall results evaluated quantitatively without oxygen meters, which were not then available. By using tank oxygen stored at high pressure, it was feasible to measure consumption approximately by calculations based on pressure drop. Since one oxygen storage reservoir held enough gas for several heats, a calculation of consumption for a group of heats fed out of one reservoir was accurate, but measurement for any single heat was difficult and only approximate.

At the furnace, a careful stopwatch record was maintained of minutes and seconds that oxygen flowed through the lance (oxygen flow time).

After a few exploratory trials, a record was also kept of lance-pipe size and lance or injection pressure. For each tank reservoir of oxygen these two conditions were held constant.

By combining the data from these records (total consumption, flow time, lance pressure and lance size) a fairly consistent and acceptable rate of flow could be derived for each combination of pressure and pipe size.

Various lance-pipe sizes were tried. Those under 3/4-inch were obviously too small; the pipe was not stiff enough, rate of flow was inadequate and pipe consumption was rapid. In the pressure range employed, sizes larger than 3/4-inch passed oxygen at such a rapid rate that momentary losses at time of injection and withdrawal were substantial; losses in the low range of carbon content (where carbon elimination is slow) seemed high; some splashing was noticeable and the flame was sometimes so intense at intermediate carbon levels as to be objectionable.

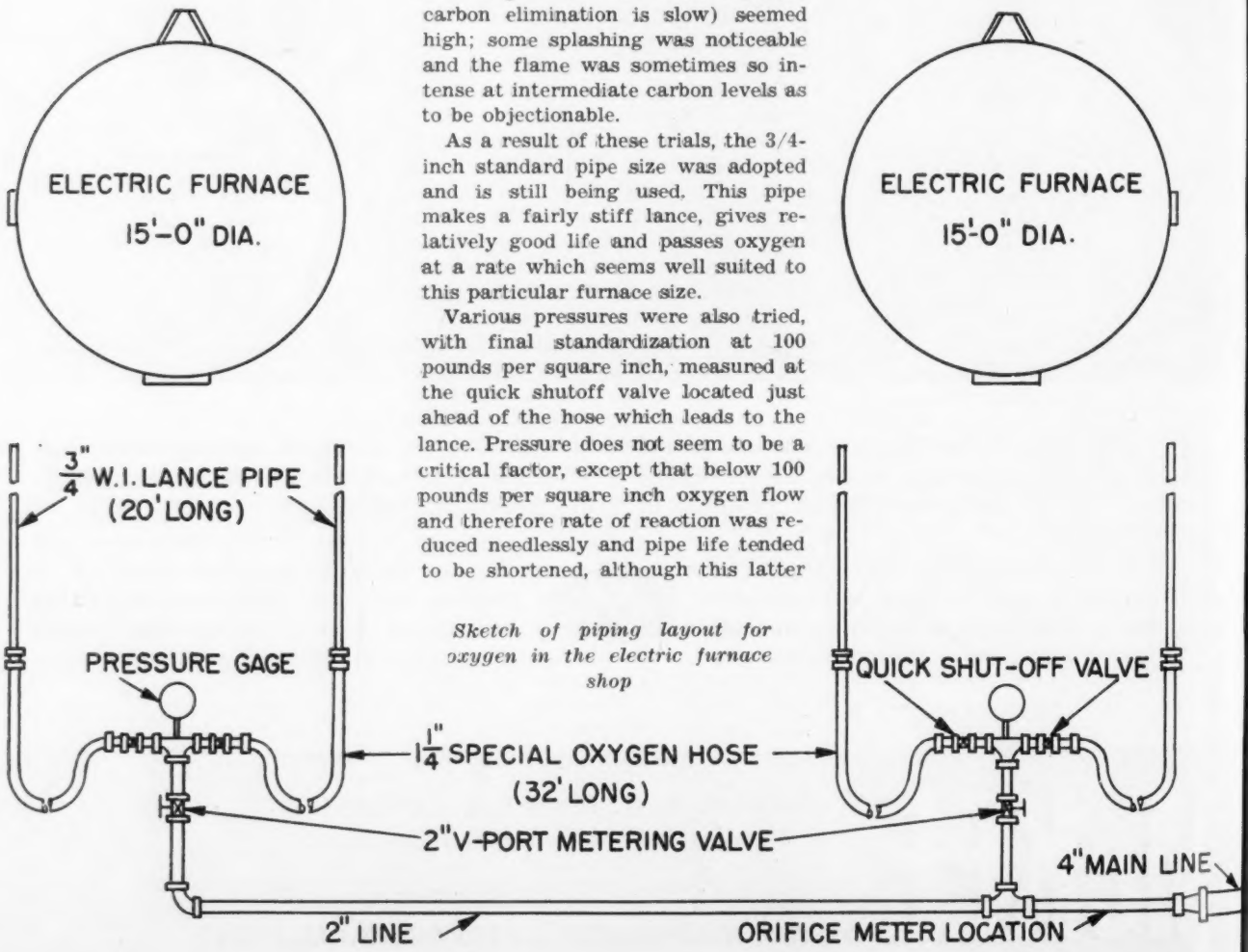
As a result of these trials, the 3/4-inch standard pipe size was adopted and is still being used. This pipe makes a fairly stiff lance, gives relatively good life and passes oxygen at a rate which seems well suited to this particular furnace size.

Various pressures were also tried, with final standardization at 100 pounds per square inch, measured at the quick shutoff valve located just ahead of the hose which leads to the lance. Pressure does not seem to be a critical factor, except that below 100 pounds per square inch oxygen flow and therefore rate of reaction was reduced needlessly and pipe life tended to be shortened, although this latter effect was not serious or consistent down to 80 or even 70 pounds per square inch. Above 100 pounds per square inch, back pressure in the pipe increased rapidly so that the operator had difficulty handling it. There was also some tendency for splashing and excessive swirling of slag and metal.

Under the standard conditions, namely, 3/4-inch lance-pipe and 100 pounds per square inch, the calculated flow seemed to vary between 430 to 480 cubic feet per minute. This variation was attributed to gas temperature fluctuations, inexact control of pressure and constantly changing lance length and depth of immersion in the steel bath.

Despite the satisfactory practical results being obtained with 3/4-inch pipe at 100 pounds per square inch, it is not intended to recommend either this size or pressure as the optimum combination. When flow meters become available this question is due for more exhaustive exploration, probably in the direction of larger pipe size and lower pressures.

After using oxygen on several hundred heats, the oxygen source was changed from the experimental high-pressure tanks to liquid storage, gasified and delivered to the several



Sketch of piping layout for oxygen in the electric furnace shop

consuming departments on demand at 150 pounds per square inch pressure and approximately constant temperature.

This liquid source is proving reliable and satisfactory, except that it is not possible to measure consumption without meters. Hence, an empirical flow rate of 450 cubic feet per minute was assumed for the standard conditions. This figure seems to compare closely in results with experience during the experimental period when consumption and rate of flow was calculated for each group of heats supplied from a single oxygen tank. Moreover, this assumed rate seems not to affect consumption chargeable to other consuming departments and is therefore judged to be approximately correct within 5 or 6 per cent.

The piping layout for oxygen use in the electric furnace department is shown in the accompanying sketch. This arrangement is not elaborate or expensive, and provides for delivery of adequate oxygen volumes at any working pressure that can be visualized now.

Use of quick shutoff valves minimizes oxygen loss at moment of immersion and withdrawal and, because gas is either completely off or flowing full, they tend to improve accuracy of the time record and uniformity of flow rate. However, these valves do not always give a tight closure so that it is necessary to back them up with a metering valve.

This latter is the only present means for controlling injection pressure and flow. From experience the operator knows that four turns maintain 100 pounds per square inch on the gage when oxygen is flowing. During actual flow, slight adjustment of this valve serves to maintain the desired pressure within 2 or 3 pounds.

Provision of dual outlets at each furnace to provide two hoses and lances avoids delay in changing to a new lance.

When meters become available one will be installed where indicated on the sketch. It will measure and register directly the amount of oxygen used for each heat, and this information will be recorded on the log sheet.

Results Obtained—First results of oxygen use indicated a much accelerated rate of carbon elimination without any deterioration of quality or any difficulty in manipulation.

If carbon is high, above about 0.70 per cent, there is usually an evolution of dense brown fumes lasting several seconds before the bright CO_2 flame becomes intense. This effect appears to be associated with elimination of other residuals, bath temperature and probably adjustment of FeO content in bath and slag.

TABLE I
PRODUCTION DATA

No. of heats	1,213
Ingots produced, n.t.	51,124
Oxygen used:	
Total, cu. ft.	5,839,400
Avg./heat, cu. ft.	4,814
Avg./n.t. ingots, cu. ft.	114
Avg. flow/heat, min.	10.4
Avg. points carbon eliminated	23.1
Rate carbon elimination, points/min.	2.3

TABLE II
SUMMARY OF COST SAVINGS/N.T. INGOTS

	—Practice—	
	Ore	Oxygen
Cost of:		
Oxygen	....	$0.40
Lance pipes	....	0.05
Savings in cost of:		
Ore, 50 lbs.	$0.20	....
Lime, 20 lbs.	0.12	....
Power, 40 kwh.	0.30	....
Electrodes, 1.5 lbs.	0.20	....
Manganese, 0.08%	0.13	....
Net saving due to oxygen		0.45
		0.50
	$0.95	$0.95

The rate of carbon removal in the high and medium carbon range down to about 0.10 per cent carbon is fairly consistent, averaging about 2.5 points per minute. Occasionally, indicated rates as high as 3.0 points with oxygen efficiency well above 75 per cent are recorded. However, results for any individual heat must be viewed with a full realization of the many variables being dealt with, so that it has been preferred throughout this study to stay close to averages for a group of heats or a period of time.

In the medium carbon range, an intense CO_2 flame appears almost at once, which continues without any consistent visual change to about 0.12 per cent carbon. Below this level the flame diminishes and so does the rate of elimination.

It is interesting that if a reaction is well started above about 0.12 per cent carbon and can be carried through to the desired end point, even as low as 0.03 per cent carbon without interruption (i. e., without changing pipes), the reaction flame and the rate hold fairly well. However, if the reaction must be started or resumed after interruption in this range, the rate is generally 1.0 point per minute or lower.

Carbon elimination rate is of course influenced by oxygen flow rate. Early experience showed definitely that carbon can be removed at rates up to 3.0 points per minute and even higher, but with the larger oxygen flow required, objections mentioned in the preceding section seemed to more than offset the advantages. Under these conditions, flame around and above the furnace is intense due to the restricted escape openings in the electric furnace, so that for this reason alone it is desirable to hold oxygen flow rate within bounds.

At the nominal oxygen input of about 450 cubic feet per minute the average carbon elimination rate over a period of several months and hundreds of heats was 2.3 points per minute. Most of these heats were taken to 0.08 per cent or less carbon and for a good many the carbon reaction was started below 0.15 per cent carbon. This average rate figures about 69 per cent chemical efficiency for the oxygen consumed, which is considered acceptable and economic.

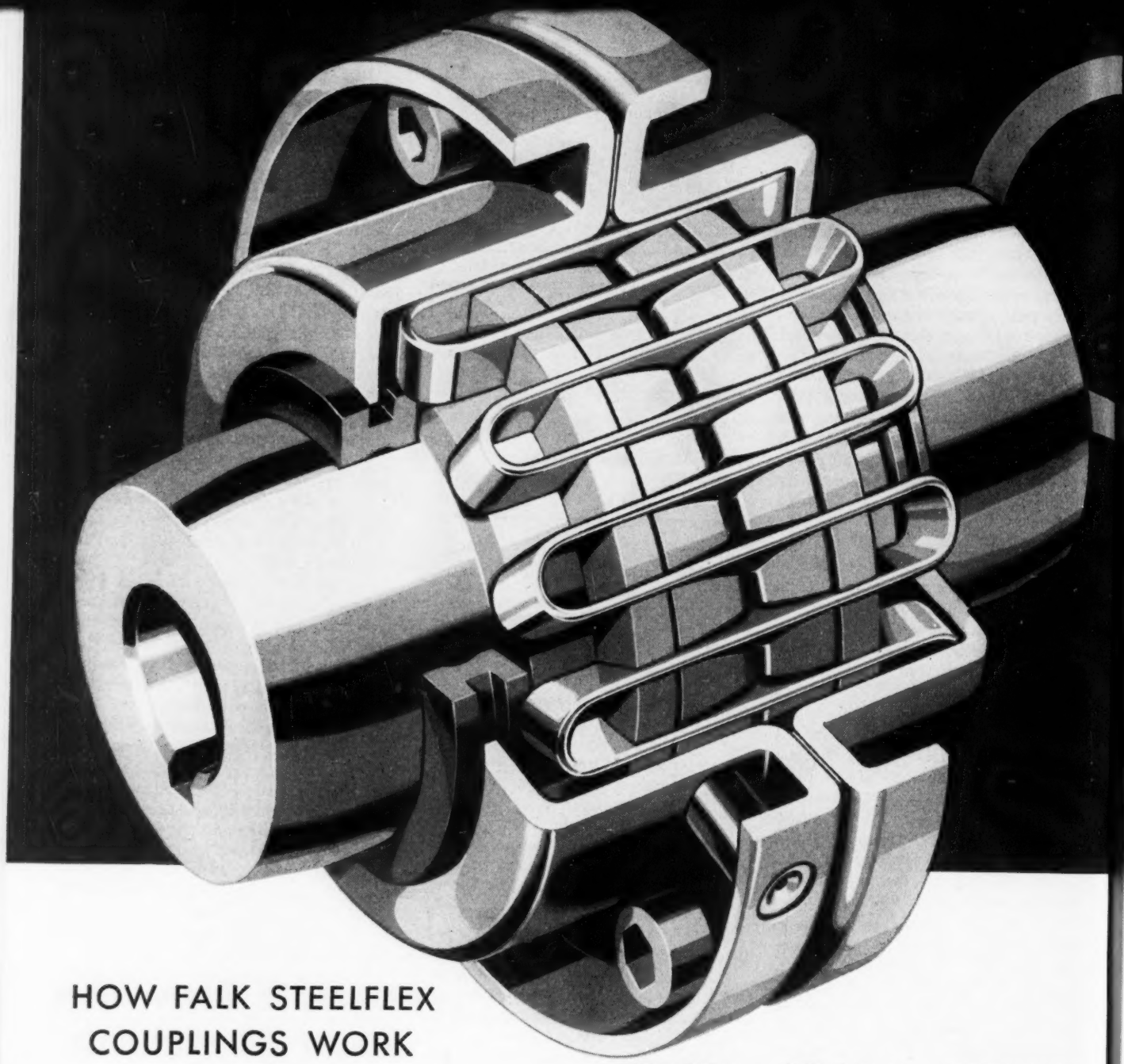
The average carbon removal rate being attained, i. e., 2.3 points per minute, is sufficient to cut time in the furnace 30 minutes or more per heat and to raise production about 1/2-ton per furnace hour. Obviously, this gain is an important one in any shop, both in total production and in conversion cost.

As production use of oxygen progressed, evidence of other benefits began to appear in sharp outline. To the extent that oxygen replaces ore, its use reduces the quantity of this bulky material that is required. Elimination of ore avoids introduction of ore gangue and hence reduces the amount of lime required, as well as spar, and results in a sharply lower slag volume for many heats. A recognizable cost saving is thereby effected and also an important saving in the amount of bulky raw materials and slag that must be handled. In this shop, both ore and lime are handled two and three times and, except for what goes in with the charge, both are added to the furnaces by hand shovel.

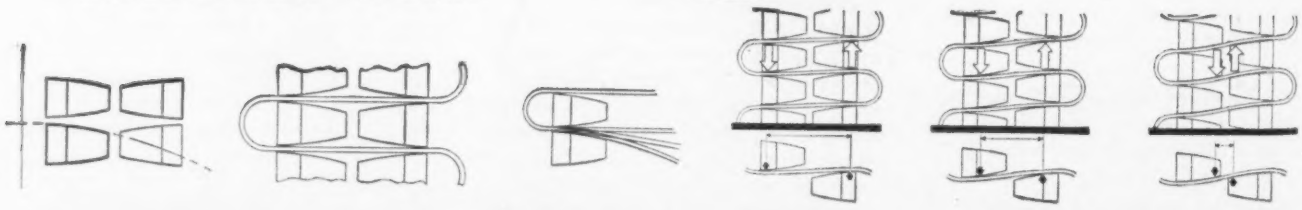
Needless to say, oxygen has been well received by the operators as it relieves them of considerable shovel work. Moreover, it eliminates the sudden, violent carbon boils that occasionally cause spills necessitating a disagreeable cleanup job.

Because the carbon-oxygen boil releases heat, carbon elimination often can be started without waiting after all-melted to warm up the bath. If meltdown carbon is high, oxygen flow may be commenced as soon as there is a large pool and the door is clear of scrap. Generally speaking, it may be said that use of oxygen in these commercial steels avoids any time penalty for elimination of carbon in the meltdown range between 0.10 and 0.50 per cent carbon. If the carbon is high in this range, it may be eliminated in the time required otherwise to finish melting and to gain temperature; if carbon is low, oxygen time is a mere 2 to 5 minutes, which is inconsequential.

Deriving both from shorter heat time and actual release of heat by the carbon-oxygen reaction, a signi-



HOW FALK STEELFLEX COUPLINGS WORK



1. Grooves, in a precise arc, and with a radius and length proportional to the capacity of the coupling, are cut into two identical hubs of moderately high carbon steel—forged of Falk alloy cast steel.

2. These grooves provide a slot for a grid member made of chrome alloy steel with an elastic limit of 180,000 pounds per square inch and an ultimate strength of 220,000 pounds per square inch.

3. This grid fits snugly into the curved grooves, which provide a scientifically cut bearing surface for the grid. This bearing surface extends from the outer to the inner edge of the grooves. The grid bears on the grooves in proportion to the load.

4. Under light loads, the grid bears only at the outer edges of the grooves. This permits a long, free, elastic span between the outer edges of both hubs. Power is transmitted through almost the entire length of the grid rung.

5. Under normal loads, the grid bears on a larger area of the grid grooves and the span of the grid run is shortened. It transmits more power and maintains its capacity to absorb shocks and dampen vibration.

6. Under peak loads, the grid rungs bear over almost all of the curved surfaces of the grooves. The span of the grid rung becomes very short. Under the impact of shock loads the grid flexes and continues to transmit power smoothly.

Twenty-two years of user experience in couplings have given Falk the service factors which indicate the proper cushioning in a circular plane. They transmit power smoothly, reduce shock, dampen vibration, cushion peak loads between power source and producing unit. Above all, they furnish the highest protection to your connected machinery—with a consequent reduction in maintenance costs, production delays and breakdowns. . . . Falk Steelflex Couplings are readily available. Stocks are maintained by carefully selected distributors at strategic locations.

ficant saving in power consumption is realized. This saving varies considerably, due to delays, extra work required for sulphur removal in some heats and other causes, but averages between 30 to 50 kilowatt hours per ton.

With shorter heat time and lower power input, some improvement in electrode consumption is to be expected. This effect of oxygen use is difficult to isolate, but it is a matter of record that electrode consumption has improved almost 2.0 pounds per ton during the period of production use of oxygen.

Similarly some significant effect on refractory life may be expected. This is even more difficult to isolate, and experience to date is too short to be conclusive, but a trend toward longer roof and sidewall life seems clearly indicated. Equally important, is a fact that no bottom trouble whatever has been experienced in the months since oxygen has supplanted ore. The sole hearth repairs required have been confined to slag line maintenance and patching ragged banks.

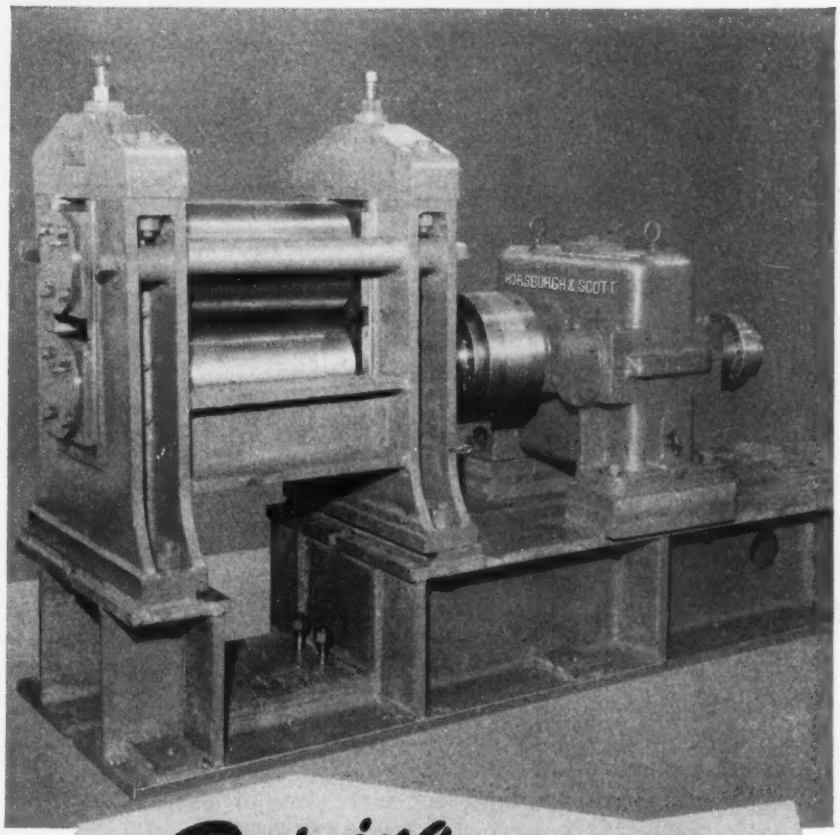
Use of oxygen works toward conservation of manganese. At 0.10 per cent carbon, manganese may be as high as 0.20 to 0.25 per cent and at 0.60 per cent carbon as high as 0.15 to 0.20 per cent. Below 0.06 per cent carbon, manganese tends to drop to about 0.10 per cent, especially if oxygen flow is interrupted at 0.10 per cent carbon or under, with the inevitable delay in getting the reaction re-established.

This characteristic higher residual manganese nets a saving of 0.07 to 0.09 per cent manganese per ton, and on black slag heats the generally lower FeO in the slag tends to give a higher yield from manganese additions. Many individual heats show a manganese saving well above 0.10 per cent, but heats which melt low in carbon are usually low also in manganese so that on these heats the gain is negligible and the overall saving is reduced proportionately.

Oxygen data for the past several months of operation are impressive in summary form. Table I lists the pertinent production and use figures and Table II translates these figures into cost savings.

This rough calculation of savings attributable to oxygen in Table II, charges to ore practice only the cost of materials used in excess of requirements for oxygen practice. The net saving amounts to not less than $0.50 per ton of ingots and this figure does not take into account the most important saving of all, which is the value of 0.4 to 0.5-ton gain in production per furnace hour.

These savings are appreciable and



Driving
RUGGED STEEL MILL
EQUIPMENT with H&S
Reducers

Here's a Mill Roll being driven by a standard Horsburgh & Scott speed reducer in a large steel mill . . . just one of thousands of H & S pinch roll, mill and special drive installations. They are rugged, dependable and accurate, backed by years of experience in supplying speed reduction units to the steel industry.

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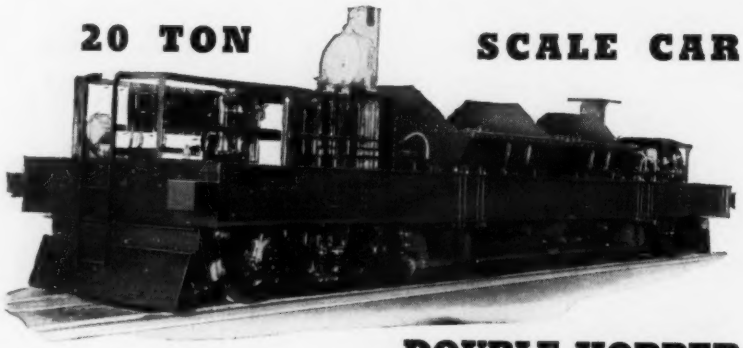
DESIGNED AND ENGINEERED FOR YOUR SPECIFIC NEEDS

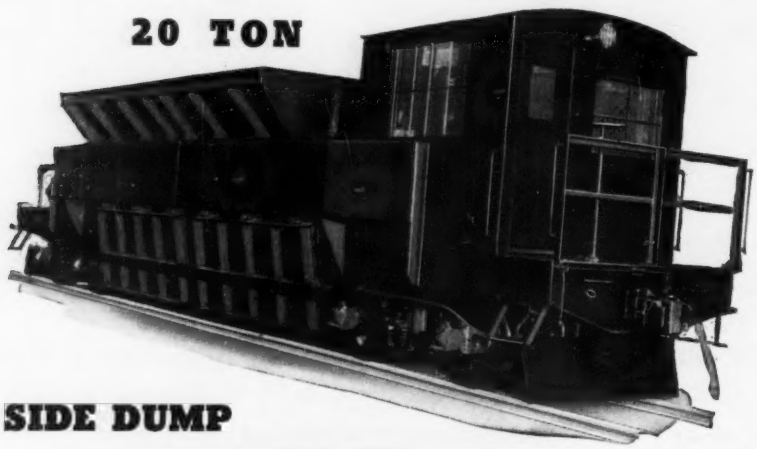
20 TON SCALE CAR



DOUBLE HOPPER BOTTOM DUMP

Car has Atlas underslung suspension scales with Atlas 24" scale Dial with chart recording. Air brakes and air-operated discharge gates. Cast steel side-frame trucks with Roller Bearings.

20 TON



SIDE DUMP ORE TRANSFER CAR

900 cu. ft. capacity, two-section hopper with electric heaters. Each section has independently-operated discharge gates. Car is equipped with air brakes, automatic couplers, headlights and whistle. Each truck mounts one 75-HP motor.

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there is good evidence that they are not merely transitory. Furthermore, they are being achieved without sacrifice of quality. During the period of this work, the company's product has consistently been up to standard. Macro and physical tests are uniformly good; yields and conditioning costs are gratifying and still improving; and response of processors and customers has been favorable.

Random Notes on Oxygen Technique—For a few heats at the start of this work, injection pipes were coated with refractory slurry, and an effort was made to use a small pipe inside a larger one with refractory materials between the two. Neither gave outstanding life in this short trial although both methods showed considerable promise. In this shop the preparation and handling of coated pipe presented difficulties so that when the supply of specially prepared pipe ran short, uncoated wrought iron pipe was used.

One objection to protected pipe was its tendency to develop a crack or weak spot in the coating where oxygen could break through some distance from the outlet end. Immediately, the pipe cut off at this point with loss of a short piece beyond the break.

At the time these trials started there was a report current that galvanized pipe was superior to black pipe. Consequently, both were tried, but nothing used in this shop proved equal to 3/4-inch standard weight, black, Byers wrought iron pipe. A 20-foot lance of this material is consistently giving from 10 to 20 minutes life.

Slag condition has an important influence on pipe life. To study this relationship, slags were deliberately varied prior to oxygen injection, with results as follows:

1. Thin watery slags, or a thin slag blanket, shortened pipe life to 2 to 5 minutes. There also tended to be some splashing.
2. A stiff slag shortens pipe life and causes splashing. However, as oxygen flow continues, this type of slag tends to thin out and shape up nicely.
3. A strongly basic slag, viscous enough to coat the pipe continuously, seemed to prolong pipe life. There is a tendency for this slag to foam up at medium or high-carbon levels when oxygen flow starts, but this tendency can be controlled well enough with repeated small doses of spar or sand. As oxygen flow progresses and carbon comes down, effervescence of the slag subsides.

Oxygen pressure has considerable influence on pipe life, as is generally reported. It appears probable that pressures slightly higher than 100 pounds might effect a considerable improvement and might also

minimize the influence of slag condition. However, rate of flow increases with higher pressures and there is some indication that any given bath has a maximum absorption rate beyond which wastage of oxygen occurs, particularly at low-carbon levels. This relationship of gas flow and gas pressure to carbon content and furnace size is deserving of further study, as it may lead to more effective use of oxygen for any given set of conditions.

Before leaving the subject of lance-pipes, it should be mentioned that the inside of pipe must be free of grease or oil to avoid flashbacks. Pickling or steam treatment appears adequate. Similarly, care must be exercised in selecting hose. Some trouble with flashbacks and burning of the hose was experienced until special hose, recommended by the oxygen supply company, was obtained.

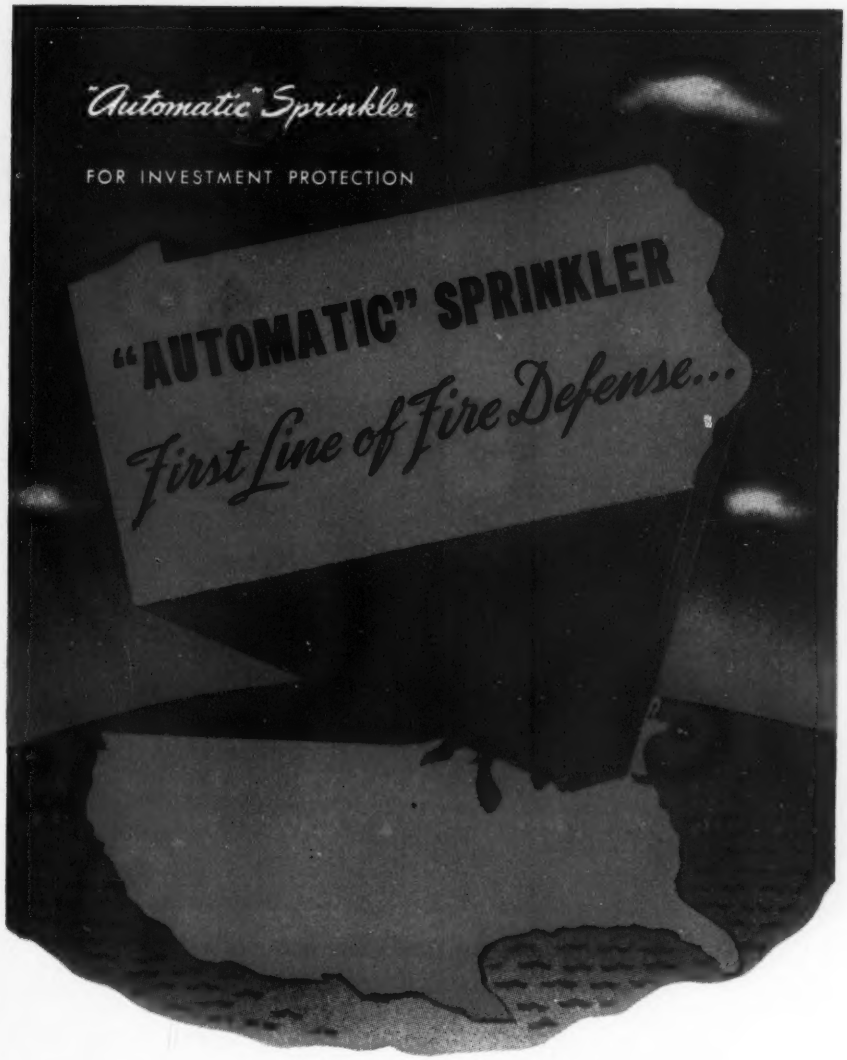
Contrary to prediction, use of oxygen ordinarily causes little splashing. This may be due to the nominal rate of flow selected and also to partial control of slag condition, but the result is gratifying. If the pipe angle is sharp there may be some washing of metal or slag up against the door through which the pipe is fed, but this is not frequent or serious.

In this shop the operator stands on a movable wood platform with steps. He carries the pipe on his shoulder or overhead and, as the pipe is consumed, walks with it down the steps toward the furnace. He gages pipe angle and position by watching the reaction and by feel of the back pressure. If the pipe-end rises to the metal surface, the reaction subsides and back pressure decreases. If the pipe is thrust deeper than necessary it is consumed more rapidly.

Normal depth of immersion is difficult to judge because it is not possible to see into the furnace during progress of a vigorous boil. Unlike the open-hearth furnace, all flame must escape through doors and electrode ports, which effectively obscures the view inside the furnace. However, judging from what evidence is available, normal immersion appears to be sufficient to position the end of the pipe 4 to 10 inches below the metal surface.

No doubt a stand can be devised to carry the pipe, to control its angle and even to advance it into the furnace. A gesture in this direction was made, but the operators appeared better satisfied to carry the pipe and since there is no strong evidence as yet that a stand would do a better job than the operator, the expense of building one has been deferred.

In this connection, it is proposed to try soon a high velocity oxygen



In Pennsylvania . . . Elsewhere, too!

For thousands of years, the greatest amount of energy has been exerted to master fire, but fire is not a trivial matter and, although you may lessen its probability, you cannot remove its possibility. The lessons to be taught from fire are not to be found in the ashes of dissipated hopes. Tens of thousands of buildings, protected by means of "Automatic" Sprinklers, stand as "perpetual monuments" of foresight.

Claims may easily be made, but the accomplishments of "Automatic" Sprinkler during more than sixty years of fire protection development, must have ability behind them. Their position has been gained by fighting fire. They have won because they have outwitted fire.

Make "Automatic" Sprinklers *your* first line of fire defense, *they're an important investment today . . . perhaps welcome protection tomorrow.*

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MORE and more important fabricators, who regularly specify Murex electrodes to obtain superior welds, are discovering there are extra dividends when M & T accessories are on the job too.

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jet developed by one of the oxygen suppliers and if this device proves satisfactory, a stand will be used at the small side door, with the big door open for more ready escape of combustion products.

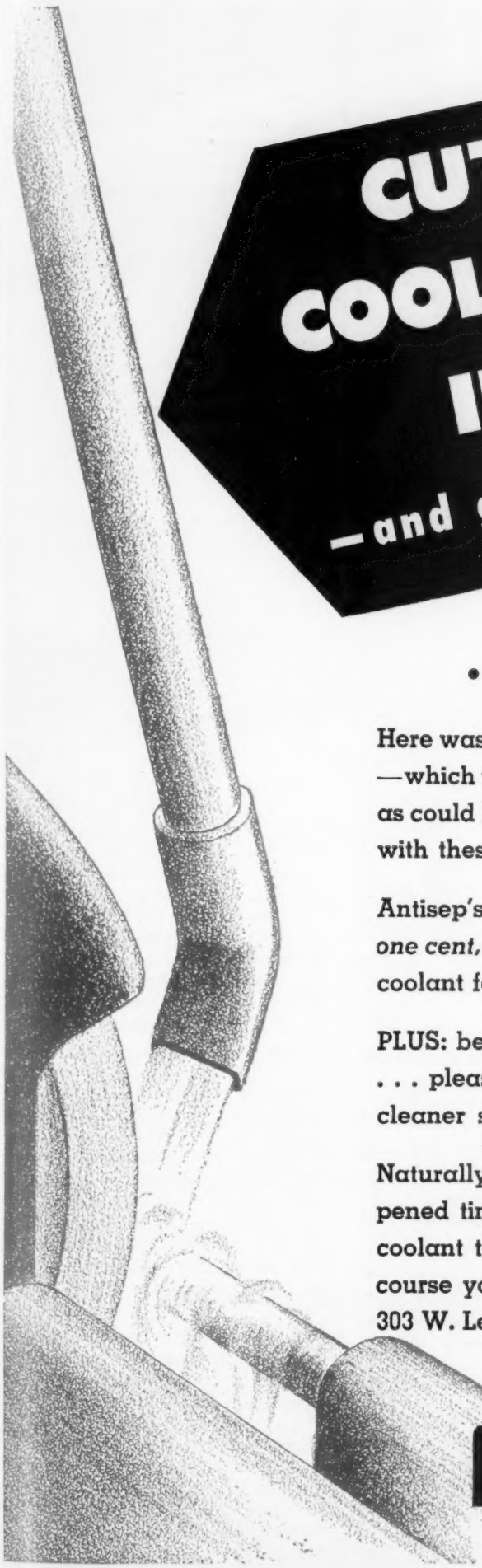
It is proper to emphasize at this point that the operator's skill has a considerable influence on oxygen efficiency, rate of carbon elimination, and pipe life. First he prepares the slag and then is responsible for manipulating the pipe. Finally, it is his on-the-spot judgment which determines whether a pipe change must be made in the range of 0.06 to 0.12 per cent carbon which causes an assured slowing down of the reaction. Each of these manipulative details is important in influencing the over-all result.

It is well understood that the carbon-oxygen reaction releases heat and some reports indicate a sharp rise in bath temperature to a point of being troublesome. For the two furnaces under discussion this evolution of heat is plainly disconcernible on many heats, but it is seldom greater than 20 to 40 degrees Fahr. Evidently lack of space for complete combustion of CO inside the furnace and radiation rate of the furnace itself are sufficient to restrict the rise in metal temperature.

The moderate rise in temperature that is obtained is put to good use. If oxygen flow is required for several minutes, it is relied on to bring bath temperature up to the level required for slag-off or tapping, as the case may be. Often more temperature is required than can be obtained from oxygen and then power is maintained on the furnace during the early stage of oxygen treatment.

It is characteristic of the carbon oxygen reaction that FeO in the slag is somewhat lower for any given carbon level than is the case with ore. At 0.10 per cent carbon, FeO may be under 15 per cent and at 0.06 per cent carbon is frequently under 20 per cent. Below 0.06 per cent carbon, FeO increases rapidly but seldom goes above 35 per cent. Within a few minutes after oxygen is cut off there is likely to be an increase in FeO but it seems not to reach the level normally encountered with ore.

There have been some reports that oxygen is used in the electric furnace to melt scrap, or in the half-melted pool to create heat for faster melting. In this shop, no deliberate use of oxygen for these purposes can be justified. At the present stage of development, oxygen is occasionally used to clear the door of scrap or to burn scrap off the banks and some-



CUT YOUR COOLANT COST IN HALF

—and get better machining!

. . . this company did!

Here was a company—nationally known for aircraft parts—which thought it already had as good a grinding coolant as could be obtained. It agreed to test Antisep Soluble Oil, with these surprising results:

Antisep's cost per gallon of diluted coolant was less than *one cent*, as against *more than two cents* per gallon for the coolant formerly used.

PLUS: better finish at higher dilutions . . . cleaner wheels . . . pleasant odor, even after week-end shut-downs . . . cleaner systems, because of its cleansing properties.

Naturally, Antisep became the standard—which has happened time after time over the nation. When you find a coolant that costs less and results in better grinding, of course you'll use it. For test, write E. F. Houghton & Co., 303 W. Lehigh Ave., Phila. 33, Pa., and all principal cities.

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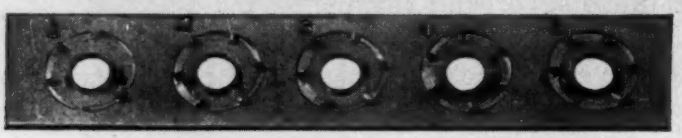
U. S. Patent
No. 2,226,491

HOLTITE 'LOCK-TITE' SCREWS
For Metal and Plastic Applications



Unretouched photo shows progressive "locking bite" of washer teeth as screw is driven in. When setup, the screw head is securely locked in the material to effect a tighter, stronger, vibration-resisting fastening.

All the advantages of a separate lock-washer and screw assembly are now combined in a single cost-cutting unit. As the lock washer is an integral part of the head this time-saving screw is driven with the same speed as a regular screw. It automatically eliminates lost time and waste, as well as the hazards of driving screws without washers in applications where washers are required.

Holtite "LOCK-TITE" screws are made to meet the specific needs of user. Design of washer teeth, type of metal, hardening and tempering can be regulcted to obtain the most efficient locking or binding action required for the application.

Accepted practice in many shops, this production-proved unit cuts costs while effecting tighter, stronger fastenings. Furnished with HOLTITE-Phillips Recessed Heads and slotted heads in round, flat, hex and binding head shapes.

CONTINENTAL SCREW CO. New Bedford, Mass., U.S.A.

times oxygen is started before all melted, thus relying on the exothermicity and turbulence of the boil to clear the bottom and pull scrap under cover.

Aside from this incidental melting with oxygen, the shape of the electric furnace seems poorly adapted to fuel combustion and melting so that it is not immediately obvious how this method can be used to advantage.

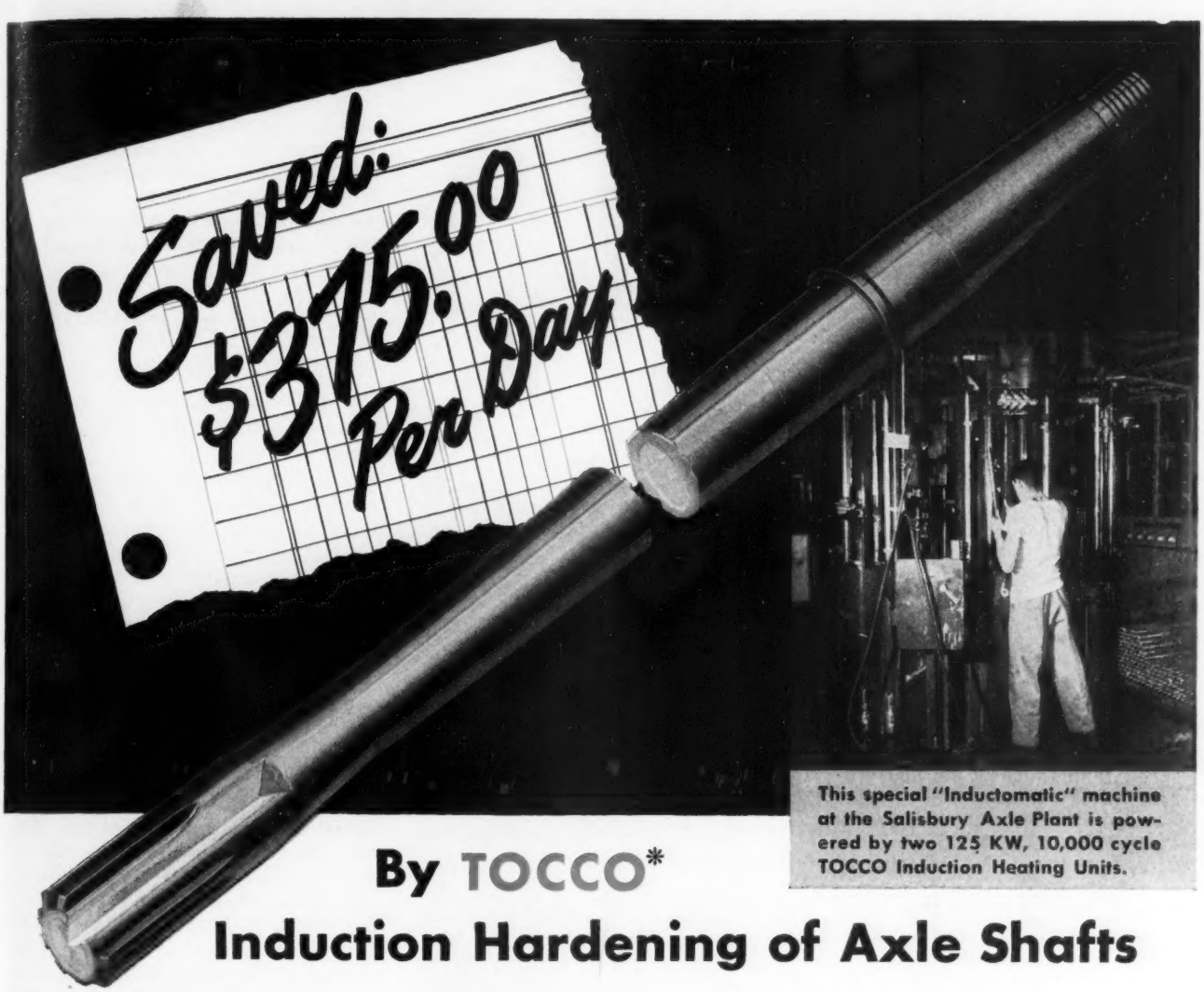
Nothing has been sacrificed in conversion yield through use of oxygen. Ordinarily, in cold scrap melting, metal reduced from ore is just about offset by loss of oxidizable elements and metal mechanically entrapped in the slag. With oxygen, there is probably less entrapment of metal and, although there is visual evidence of some iron oxidation, ingot yields average the same as with ore practice.

Summary and Conclusion—More than 1200 heats of commercial grade steel have undergone oxygen treatment for elimination of carbon at our electric furnace shop. In the first trials, oxygen replaced some feed ore. The next step, taken shortly thereafter was to replace substantially all feed ore, and finally, use of charge ore was discontinued as well.

As a result of this substitution of oxygen for ore, the normal heat cycle has been shortened, the production rate in tons per hour has risen, other cost savings directly attributable to oxygen use amounting to some $0.50 per ton have been realized, quality has certainly been maintained and possibly improved. Incidental advantages attributable to oxygen are the lesser volume of raw materials and slag that must be handled and the lesser amount of manual labor required.

This work is not, by any means, a final appraisal of the worth of oxygen in the electric furnace or of methods for its use. It was confined strictly to one broad class of commercial steels, mainly low in carbon and all low in alloy content; it was adapted to two particular furnaces, to shop conditions that differ in some respects from most others, and to the raw materials situation in effect during the period of the work.

It is not proper, therefore, to generalize broadly on the basis of this experience or to expect exact duplication of the results reported under any other set of shop conditions. However, the results obtained do seem sufficiently conclusive to warrant the observation that oxygen use promises to be particularly well adapted for carbon elimination in the electric furnace and offers rea-



This special "Inductomatic" machine at the Salisbury Axle Plant is powered by two 125 KW, 10,000 cycle TOCCO Induction Heating Units.

By TOCCO* Induction Hardening of Axle Shafts

WHAT progressive engineers at the Salisbury Axle Division of Dana Corporation have done with Induction Heating for hardening automotive axle shafts suggests comparable savings for your products. Note this report:

SAVINGS of $375.00 per day caused by increased output and switch from SAE 4140 to SAE 1033 steel made possible by induction hardening.

LESS MACHINING time because shaft of SAE 1033 steel is completely machined prior to hardening. Tool cost cut in half—turning time reduced from 2 minutes to 30 seconds.

PRODUCTION DOUBLED. Formerly 50 axle shafts per hour with conventional combustion type heating—now 120 per hour with TOCCO.

PRODUCT IMPROVED. Torsional fatigue has increased 200%. The shaft is no longer a compromise between durability and machinability. It is hardened to 55 RC and drawn back to 43-47 RC. Degree of hardness and depth is accurately controlled.

TOCCO Engineers will gladly survey *your* operations for similar cost-cutting results in hardening, heat-treating or brazing—without obligation.

THE OHIO CRANKSHAFT COMPANY

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Please send copy of "TOCCO Hardening".

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A Metal ROSE

By another name

IN THESE DAYS OF STEEL SHORTAGES

NM

In these days of critical steel shortages many manufacturers are saying: "If there is another rose that would smell as sweet, lead us to it." If you use bright plated metals for decorative or functional use, we offer substitutes for steel base metal . . . and they are AVAILABLE! We refer to such Nickeloid Metals as Chrome or Nickel plated to base metals of zinc, copper, or brass. All are available in sheets, in coils, bright or satin finish; coated one or two sides; in a wide range of gauges, tempers.

Nickeloid Metals using such base metals as zinc, copper, or brass are *time-tried* and *proven*. All are easily workable, and for many applications can be used as a satisfactory alternate for steel — at no extra fabricating cost. Ask our representative to call.

Free New Booklet Tells
USES for NICKELOID METALS

This colorful illustrated booklet tells many of the ingenious ways in which manufacturers are using Nickeloid Metals to improve the appearance and marketability of their products. Write for it on your company letterhead.

50 Years of Pre-plated Metal Leadership

AMERICAN NICKELOID COMPANY

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PERU 1, ILLINOIS

sonable expectation of substantial gains in production and costs and probably also in quality.

In conclusion, it is desired to acknowledge the support of the A. M. Byers Co. management, technical staff and operators whose keen interest in the work and wholehearted co-operation were indispensable factors in its successful outcome.

Sulphur in Fuel Oil

(*Concluded from Page* 107)

Fig. 1. Close tube with special stopper and observe sample through the sight.

When sample begins to burn, add potassium iodate from burette dropwise to maintain the blue color. After color is semi-permanent, insert whole boat into hot zone with rod in stopper and again titrate to a permanent blue. For per cent of sulphur divide reading by weight of sample.

Gas Moisture Measured By Electrolytic Film

Measuring of small amounts of water vapor in gases is possible with an improved method developed by E. R. Weaver of the National Bureau of Standards, Washington. This procedure, which may also be extended to the determination of the moisture content of certain liquids and solids, depends essentially on the change in electrical resistance of an electrolytic film as it absorbs water vapor. It is said to have the advantage of speed, simplicity, high sensitivity and wide range.

Flexible in operation, it is also said to be readily adaptable to numerous applications, such as measuring the moisture permeability of membranes, detecting minute concentrations of combustible gas in air or of oxygen in combustible gas measuring the capacity of drying agents and measuring the relative humidity in small or comparatively inaccessible spaces under rapidly changing conditions.

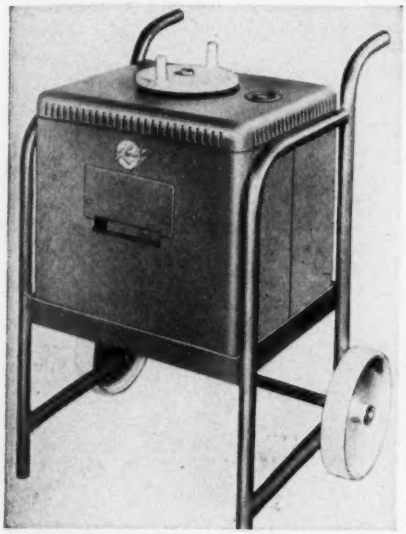
Problem of maintaining comfortable working conditions at the working level without uselessly heating all of the air far above the workman's head was solved by the installation of two direct fired 1,000,000 Btu Counterflo heaters in the new plant of Penn Iron Works, Reading, Pa. Built by Dravo Corp., Pittsburgh, the heaters discharge approximately 11,000 cubic feet of air per minute from four directional nozzles on each heater. Said to be established is a "comfort zone" extending from the floor to about 10 feet above the floor.

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 156

1. AC Welders

Three industrial models of 200, 300 and 400 amperes and two models for general use of 130 and 180 amperes comprise the line of NEMA rated alternating current welders introduced by John A. Kern Co., 224 North Loomis St., Chicago 7, Ill. Units have electrical and magnetic circuits which result in an instant



starting, smooth and stable arc at all amperage settings.

Welders are compact because movable core on all models travels less than 1 inch to cover entire range of stepless amperage control. Cooling is brought about by ample air passages around coils and cores. Carriages are welded steel tubing and have large diameter cast aluminum wheels.

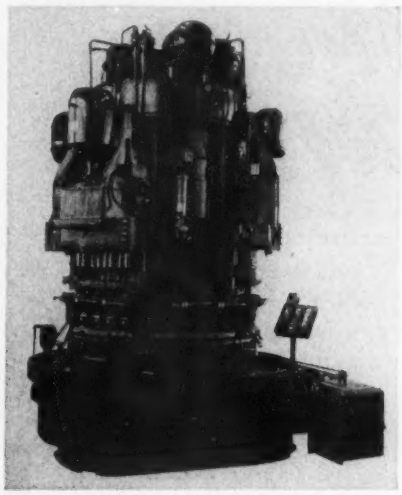
2. Electronic Amplidyne

Consisting of a high-gain balanced direct current electronic amplifier and a motor amplidyne, a new electronic amplidyne, made by General Electric Co., Schenectady 5, N. Y., is designed for motor control where precise regulation of current, voltage and speed is neceessary. It is for use as a regulated adjustable voltage power supply for direct current motors up to 1½ horsepower and as regulated exciter for larger adjustable voltage drives up to 200 horsepower.

Output of the unit is 1½ kilowatts, 250 volts. It is arranged for use on either a 220 or 440 volt, 3-phase, 60 cycle power supply. The electronic amplidyne makes possible a speed range of 20 to 1 or greater, maintaining speed closely at any setting, regardless of load conditions. Current limited regeneration braking provide quick stopping.

3. Five-Station Machine

Sommer & Adams Co., Warren, O., has developed a high production special processing machine for drilling, reaming and counterboring automobile engine connecting rods and caps. The 11-foot high, 36,000-pound machine produces over 240 completed assemblies per hour with a single



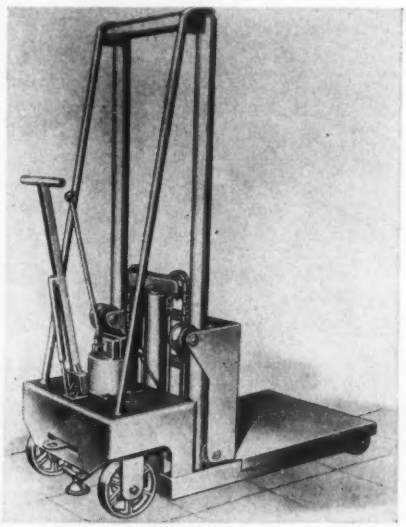
operator. The five-station machine is all pushbutton controlled. Spindles are controlled for tool setup through manual controls at each station.

Machine has an automatic cycle for continuous operation, a motor driven hydraulic unit indexing and locking the table. Each of five stations has a self-contained hydraulic system. Work pieces, which are broached before being brought to the machine, are worked four at a time at each station.

4. High Lift Truck

Four-wheel suspension, a synchronized steering device and a towing eye are standard features of the new 3000 pound capacity high lift truck announced by Lyon-Raymond Corp., 4314 Madison St., Greene, N. Y. This easily operated truck lifts, elevates and transports capacity loads, supports heavy overhanging work, serves as a feeding table for heavy operations, simplifies handling and positioning of dies, tools and fixtures and assists in tiering skid loads.

Truck has fork type tubular frame with a 30 x 36 inch load platform.



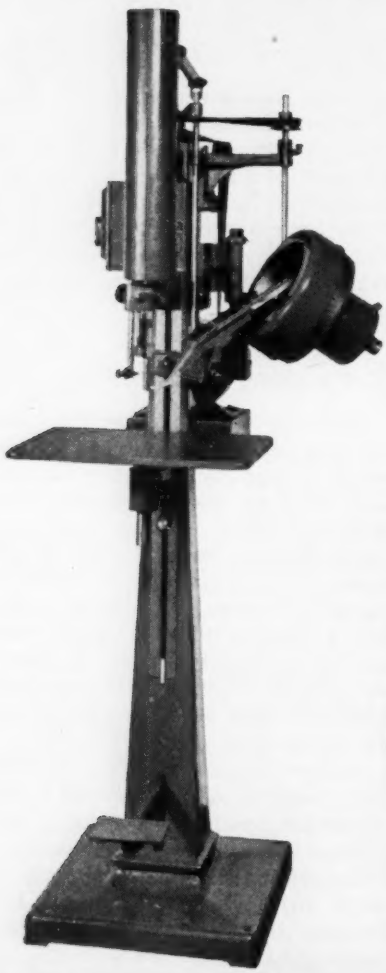
Standard equipment includes a floor lock brake. Power is furnished by a two speed hydraulic hand pump, but a motorized pump, operated by a ¾-horsepower motor can be furnished. Other extras include die separator and winch. Platform has elevation range from 6 inches lowered height to 54 inches.

5. Polishing Machines

Polishing, buffing, deburring and grinding may be performed on the improved line of Packer-Matic machines announced by Packer Machine Co., Meriden, Conn. No. 424 continuous rotary machine has a 24 work spindle work table, operates at variable speeds and each of its three stands has a 14-inch diameter wheel with a 9-inch buffing face. No. 13 continuous rotary machine has 78 work spindles, five work stands, an 8-foot table and electric controls.

Rotary indexing machine No. 2-12 (also built as continuous rotary) has all electric pushbutton control, 12 ball bearing chuck spindles and individual wheel stands, wheels of which may be set at any angle. No. 2 straight line machine is built in various widths and lengths with any number of heads. Its conveyor has a variable speed control. Five work holding stations are included on the No. 9-6 rotary ma-

DETROIT POWER SCREWDRIVERS



Yes, speed far beyond what you would expect . . . These remarkable machines will drive screws as fast as ONE A SECOND . . . Think of it! Realize what a tremendous speed-up in production that means . . . What a saving in time and labor . . What a big reduction in costs! 3 models to choose from to fit your individual requirements, to cover a range from No. 2 to ⅝" diameter screws. All screws driven to uniform tension; no marring of heads, no stripping threads. Get catalog now . . . Send sample assemblies for production estimates and prices on proper equipment for your needs.

DETROIT POWER SCREWDRIVER CO.

2811 W. Fort Street
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chine. Its wheels may be set at various angles.

6. Fork Truck

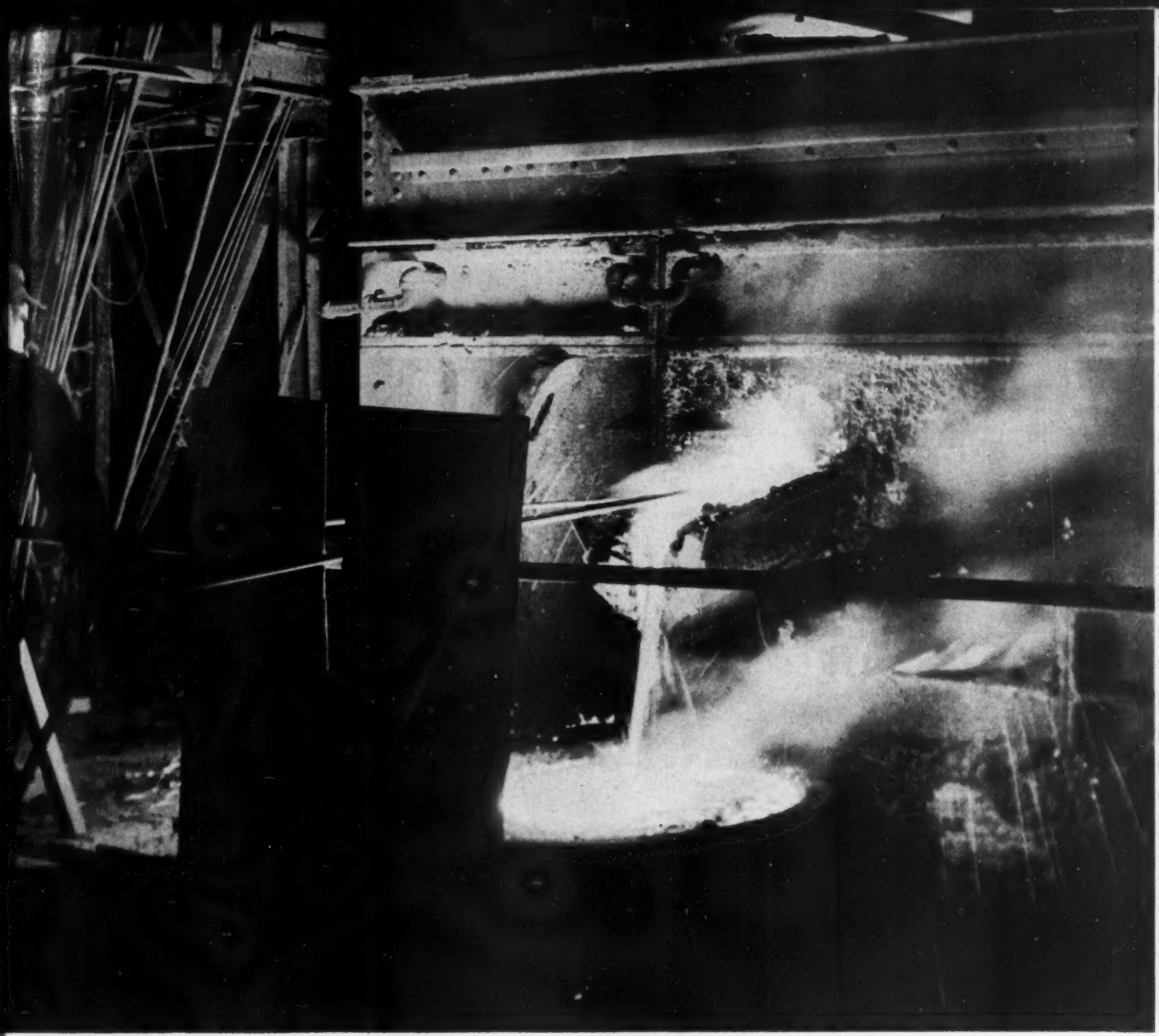
Ability to lift 4000, 5000 and 6000 pounds to 124 inches and 7000 and 8000 pounds to 115 inches is a feature of the new line of Skylift Brawny fork trucks, offered by Automatic Transportation Co., 149 West 87th St., Chicago 20, Ill. Each of the five models has a collapsed height of 83 inches. Their hydraulic lift telescopic action is engineered so that the forks and uprights are raised independently by separate rams.

Trucks have the Newmatic controller which functions as the electric counterpart of the automotive automatic gearshift, eliminating tire slippage, enabling smooth acceleration and reducing peak electrical load. Power steering is available as an optional feature.

7. Dewpoint Recorder

Featuring the new line of dew point recorders and recording controllers, made by Foxboro Co., Foxboro, Mass., is the Dewcel which has the appearance of a perforated metal cylinder. Within it is a central tube containing the thermal bulb, wrapped with a saline-saturated woven glass tape and two windings of silver wire to conduct the heating current. Recording of the instrument is continuous and in various standard chart ranges.

Two types of recorders are offered —the Dynalog all electronic instrument and the liquid filled system type. Pneumatic or electrical control systems for operation of valves, dampers or motors may be supplied in eith-



Highest Quality Steels
MADE WITH VANCORAM FERRO VANADIUM

The high quality of Vancoram Ferro Vanadium, consistent from lot to lot, assures the steelmaker closer control during production and a finished product of unexcelled microstructure and physical properties. The alloy is produced in the following grades to meet the requirements of various products and manufacturing tecnnics:

	Typical Composition
GRADE "A" *(Open Hearth)*	Vanadium . . . 35-40% Silicon . . . . max. 12% Carbon . . max. 3.50%
GRADE "B" *(Crucible)*	Vanadium . . . 35-45% Silicon . . . max. 3.50% Carbon . . max. 0.50%
GRADE "C" *(Primos)*	Vanadium . . . 35-45% Silicon . . . max. 1.25% Carbon . . max. 0.20%
HIGH V GRADES	Vanadium . . . 50-55% 60-65% 70-80% Silicon . . . . . Low Carbon . . . . . Low

Large stocks are carried of all grades of alloys, and they can be supplied in any of the standard lump, crushed, or mesh sizes.

Our metallurgists will be glad to assist you in the application of Vancoram Ferro Vanadium to meet your specific requirements.

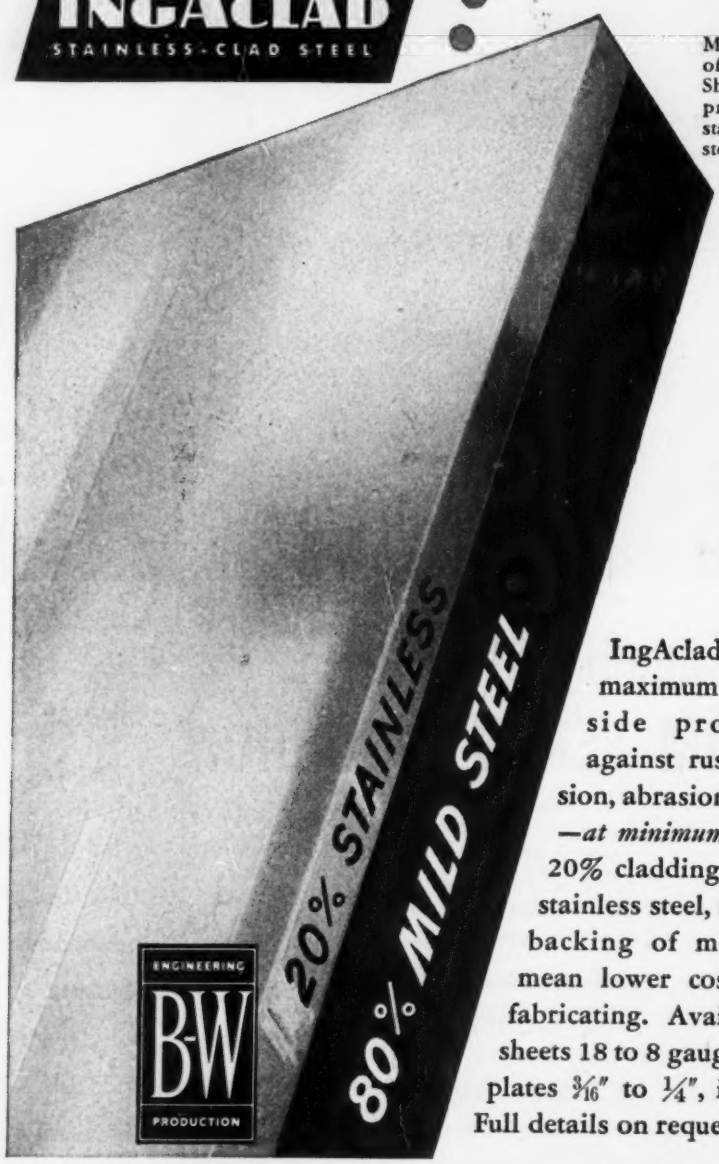
MAKERS OF FERRO ALLOYS VANCORAM *CHEMICALS AND METALS*

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

for
any
application
where
stainless steel
is needed
only on the
contact side
nothing beats

INGACLAD
STAINLESS-CLAD STEEL

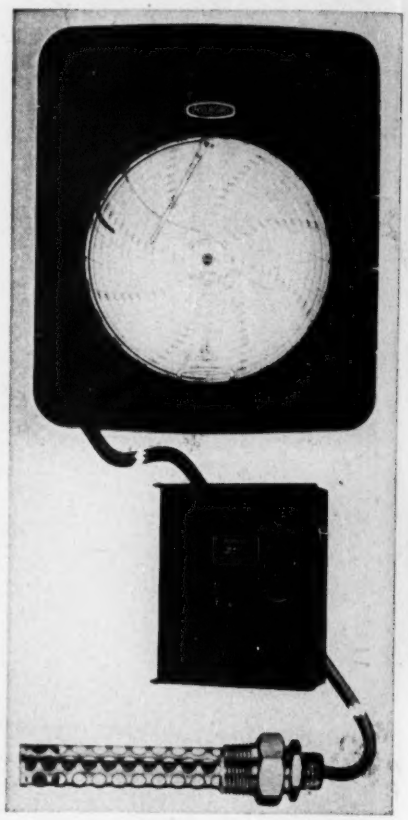


Magnified view of IngAclad Sheet to show proportion of stainless to mild steel.

IngAclad provides maximum contact-side protection against rust, corrosion, abrasion, erosion —*at minimum cost.* Its 20% cladding of solid stainless steel, and 80% backing of mild steel mean lower cost, easier fabricating. Available in sheets 18 to 8 gauge, and in plates 3/16" to 1/4", inclusive. Full details on request.

INGERSOLL Steel Division • **Borg-Warner Corporation**
310 South Michigan Ave., Chicago 4, Ill.
Plants: Chicago, Illinois; New Castle, Indiana
Kalamazoo, Michigan

er type. Installation may be either indoors or outdoors. The recording instrument may be mounted in a con-



trol panel as much as 600 feet from the Dewcel measuring element.

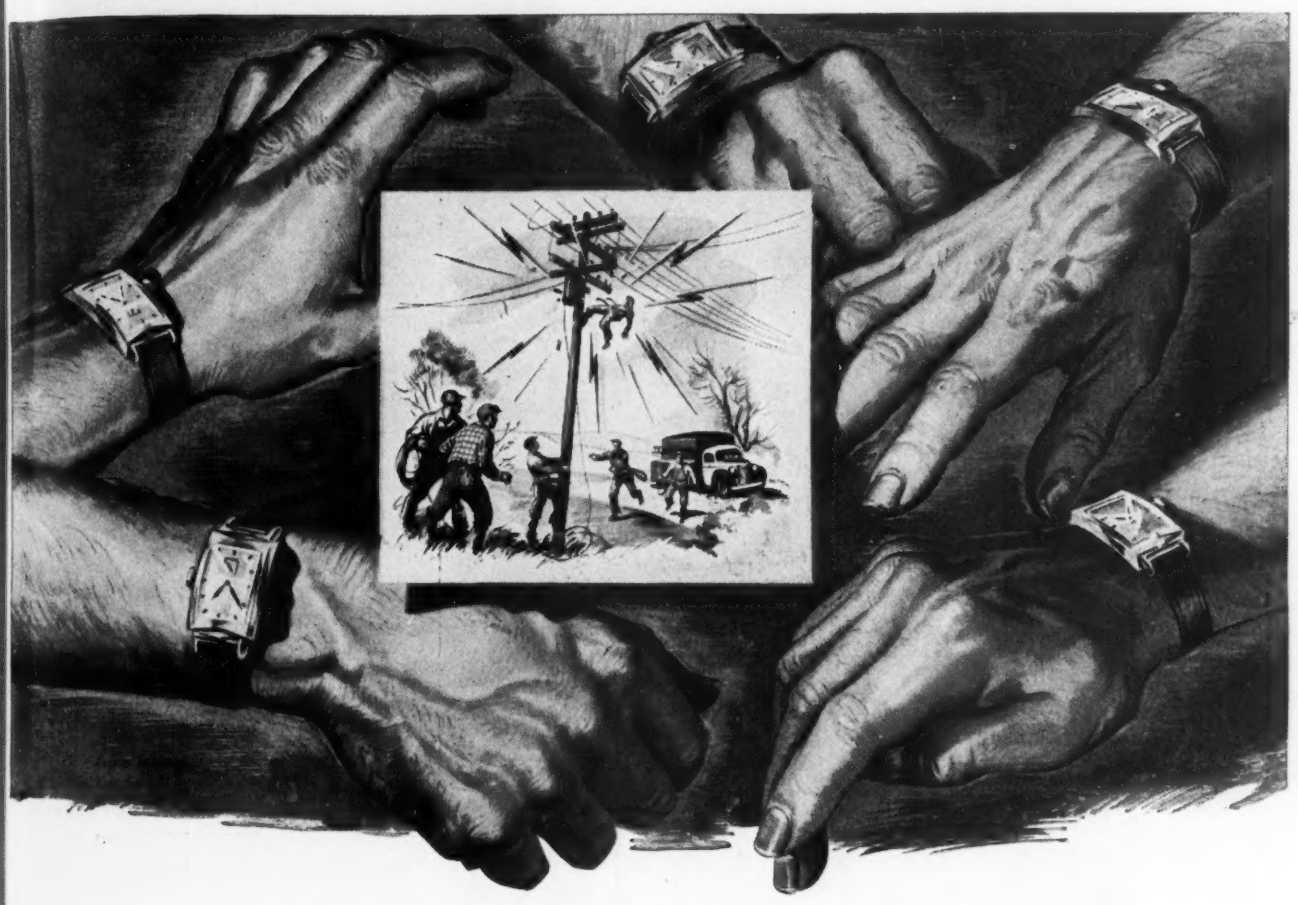
8. Forming Press

Originally designed for high speed marking, but working equally well for assembling, forming and other medium and light pressing operations, the Automark press, made by Defiance Machine & Tool Co. Inc., 1920 South Vandeventer, St. Louis 10, Mo., may be operated automatically or by hand.

Parts to be processed have to be touched into the locating fixture containing a microswitch. Operation is instantaneous. Equipped with a hopper type dial feed fixture, it will mark 15,000 parts per hour. The average hand fed setup will accommodate up to 3000 parts per hour. Operation is pneumatic.

9. Metallizing Gun

Faster and more thorough application of metals such as steel, aluminum, zinc, lead, bronze, copper, nickel and others is reported for the new metallizing gun developed by Vande Mfg. Co., 1837 South Michigan Ave., Chicago 16, Ill. Backfire is completely eliminated from the gun, the nozzle of which mixes the gas



Six Workers + E-M Foresight = Five Heroes

Employers Mutuals Job Safety Training seemed "dull stuff" until the moment of tense drama came . . .

All six men of the power-line crew had received Employers Mutuals safety training... wondered whether such "dull routine stuff" was necessary, until one day—

A severe electric shock hurtled one of their number from a pole, his clothing aflame. His five mates, ready for such emergency, quickly beat out the flames, loosened his clothing, induced artificial respiration, had him well on the way to recovery within a half hour.

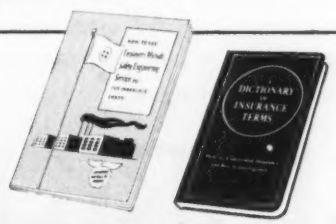
Each received a gold watch from Employers Mutuals in recognition of his part in saving a fellow worker's life.

Throughout industry, in every type of business, thousands of men and women are taught such life-saving practices, trained how to act in an emergency by Employers Mutuals engineers and industrial nurses.

Skill in accident prevention, control of industrial health hazards, development of first aid programs . . . all are accomplished with a tactful, human approach that builds good will and makes Employers Mutuals services unique in the insurance field.

Employers Mutuals write: Workmen's Compensation—Public Liability—Automobile—Group Health and Accident—Burglary—Plate Glass—Fidelity Bonds—and other casualty insurance. Fire—Extended Coverage—Inland Marine—and allied lines. All policies are nonassessable.

Your plant accident experience materially affects the cost of your workmen's compensation insurance. Send for Employers Mutuals' booklet, "Safety Engineering." It explains the importance of such facilities and experience in keeping your accidents under control. Also be sure to have our "Dictionary of Insurance Terms." It will help you to understand the provisions of your policies. Send for these valuable, informative booklets on your letterhead—or call your local Employers Mutuals man.



Employers Mutuals Policies Protect Lives, Health and Property

EMPLOYERS MUTUALS OF WAUSAU . . . make insurance understandable

EMPLOYERS MUTUALS OF WAUSAU

EMPLOYERS MUTUAL LIABILITY INSURANCE COMPANY OF WISCONSIN
EMPLOYERS MUTUAL FIRE INSURANCE COMPANY
HOME OFFICE: WAUSAU, WISCONSIN

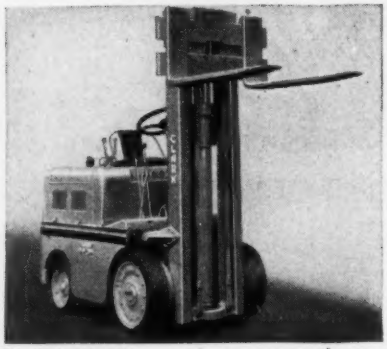
Offices in Principal Cities—Consult Your Telephone Directory

MATERIAL HANDLING *News*

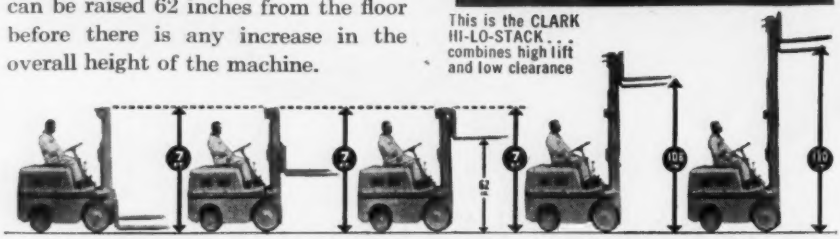
With this high-lift, low-clearance attachment, a Clark fork truck can take material through a freight car door and tier loads to the car roof, as well as tier loads rafter-high in the warehouse.

TIERING HEIGHT 130"
COLLAPSED HEIGHT 83"
FREE LIFT 62"

That "free lift 62 inches" is the vital specification of HI-LO-STACK, Clark's new high-lift, low-clearance attachment. It means that the forks can be raised 62 inches from the floor before there is any increase in the overall height of the machine.



This is the CLARK HI-LO-STACK . . . combines high lift and low clearance



83 INCHES OVERALL HEIGHT, FORKS LOWERED | NO CHANGE IN OVERALL HEIGHT WITH "FREE-LIFT" OF FORKS UP TO 62 INCHES | UP-UP-TO 130 INCHES—22 INCHES ADDITIONAL LIFT FOR EXTRA HIGH TIERING

You recognize instantly the practical benefits of the HI-LO-STACK—it enables a fork truck to take a load through the 7-foot door of a box-car and tier loads to the roof of the car, or to tier unit loads to the rafters in the warehouse. Heretofore, with conventional lift mechanisms, the increasing height of the vehicle made it impossible for the same machine to perform all these operations; making it necessary, in many handling operations, to use two machines—one for loading and unloading cars and another for high tiering in the warehouse.

Also HI-LO-STACK is an exceedingly simple mechanism. It has only one lift cylinder, and a single set of uprights with slide members inside. Lifting is accomplished with unusually low hydraulic pressure, which minimizes possibility of leakage.

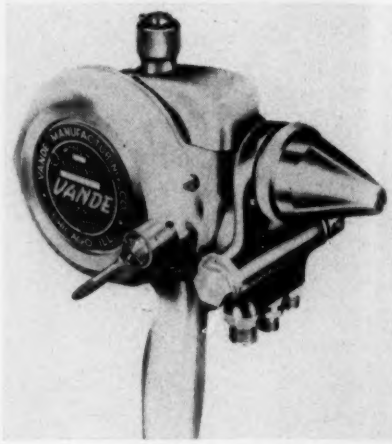
It adds up that HI-LO-STACK is a typical Clark development—sturdily built, simple as can be, a thoroughly dependable unit; a good example of the sound engineering and incomparably rich knowledge of handling operations for which Industry looks to Clark. Write for particulars.

CLARK GAS AND ELECTRIC POWERED **FORK TRUCKS**
AND INDUSTRIAL TOWING TRACTORS

CLARK EQUIPMENT COMPANY, TRUCTRACTOR DIVISION, BATTLE CREEK 26, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

and oxygen at the point of combustion. Each wire nozzle provides the exact volume for acetylene, propane or ether gas.

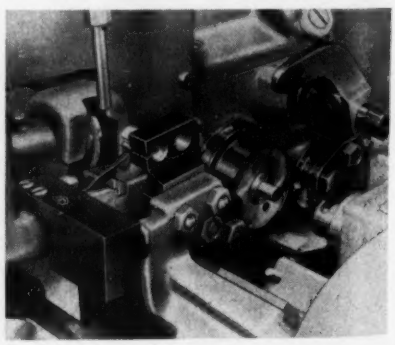
Finger tip turbine control is achieved by a compound turbine containing a rotor and stator responsive to opposing propulsion fluids. One jet



remains in a fixed position in the primary turbine while a second is directed by a control lever in the secondary turbine and either reduces or increases primary turbine speed, affording wire feed control.

10. Threading Machine

Designed to take full advantage of overlapping operations and reduce idle time to a minimum, an automatic screw threading machine, announced by Brown & Sharpe Mfg. Co., Providence 1, R. I., makes possible high production of small screws, nuts and bushings. Both work and threading spindles rotate in the same



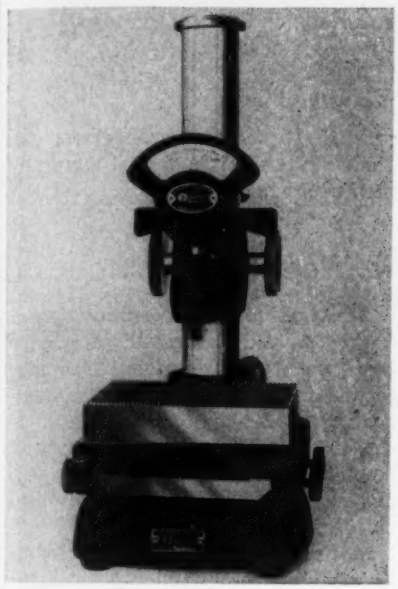
direction, but at different speeds. Speed differential permits die or tap to cut at required surface speed for threading while work rotates at suitable speed for turning or other operations.

Work spindle speeds cover 16 ranges from 5000 to 454 revolutions per minute. There are 32 threading spindle speeds from 7000 to 545 revolutions per minute, giving 32

changes of thread cutting speeds from 2000 to 91 revolutions per minute. Stock to ⅜-inch diameter and thread lengths to 1 inch may be handled.

11. Comparator

Production and inspection measuring jobs covering a wide range may be carried out with the new model 108 comparator, manufactured by Standard Gage Co., Poughkeepsie, N. Y. It has provision for five interchangeable tables and the use of



standard indicators. When equipped with the Micronar indicator, plug gages may be checked.

Any AGD dial indicator of No. 2 or 3 size having a standard lug-type back can be used. Thus an indicator having graduations appropriate to the accuracy desired may be mounted on the comparator. Raising, lowering and approximate positioning of the indicator support arm are made by a rack on the rear of the column. A wing handle effects fine adjustment.

12. Hydraulic Unit

A portable hydraulic power unit capable of supplying 3 gallons per minute at 1000 pounds per square inch is a development of Hydro-Power Inc., Springfield, O., for the operation of such equipment as arbor presses, broaching tools, pipe benders, vises, etc. Unit includes an integral 17 gallon storage tank, an electric motor, V-belt connected gear pump and 4-way operating valve.

Mounting of the 290-pound (complete) unit may be on casters, hand truck or stationary. Normally sup-

For Emergency Repairs

...weld cast iron with Ampco-Trode 10 —save time and money...

Typical of the way Ampco-Trode 10 saves money for its users is this tricky repair job. This cast-iron road-grader drive housing was badly damaged when a drive shaft broke. Replacements were not available. Ampco-Trode 10 took over. Only a slight preheat was necessary so that the welder had no trouble in handling the casting. All joints were V'd out and the welding done in two passes — once with an ⅛" rod and again with 3/16" rod.

One of the breaks passed through a machined flange. But the fact that Ampco-Trode 10 provided a machineable deposit as well as good strength and ductility solved this problem.

You, too, can save time and money with Ampco-Trode 10. This all-purpose aluminum bronze electrode gives you these important welding advantages:

- **Welds dissimilar metals**—steel to clean cast iron; steel or cast iron to bronze, brass, and copper; and all these to nickel alloys.
- **Ideal for bearing applications and overlays** — where hardness and resistance to wear are essential factors.
- **Resists corrosion** — this quality is extremely useful when fabricating process-industry equipment.

Get a supply of these easy-to-use, money-saving aluminum bronze electrodes today. See your nearest Ampco distributor. Write us for latest Ampco-Trode 10 bulletin giving additional facts.

AMPCO TRADE MARK

Ampco-Trode 10 is a product of

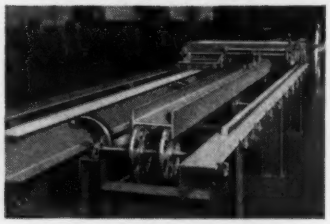
Ampco Metal, Inc.

Department S-2 Milwaukee 4, Wis.

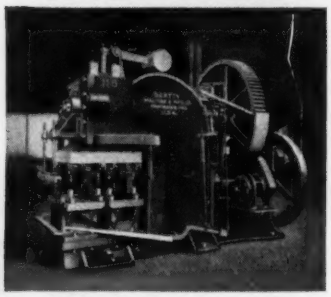
W-101

WHEN A MAN WITH A PROBLEM...
MEETS A BEATTY ENGINEER...
THERE'S ALWAYS A HAPPY ENDING—
FOR TWO HEADS ARE BETTER THAN ONE —ESPECIALLY IF THE OTHER ONE IS OURS!
THERE'S A BETTER WAY TO DO IT!
HYDRAULIC
HEAVY METAL WORKING
EQUIPMENT
BEATTY
MACHINE AND MFG. COMPANY
HAMMOND, INDIANA

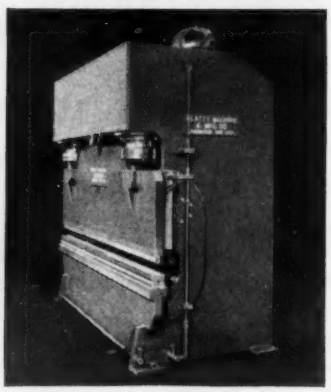
BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging, bending.



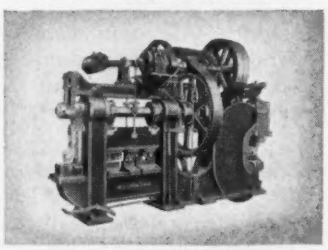
BEATTY Spacing Table handles flange and web punching without roll adjustment.



BEATTY No. 11-B Heavy Duty Punch widely used in railroad industry.

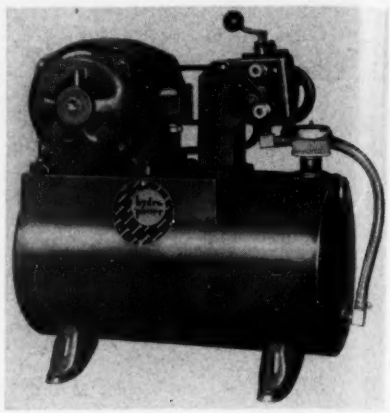


BEATTY Hydraulic Press Brake for V-bending, forming, pressing, flanging.



BEATTY CoPunShear, one unit does coping, punching, shearing.

plied with a 1-1/2-horsepower, 1800 revolution per minute, 220 volt motor, it may be used with a 2-1/2-horsepower, 1200 revolution per minute



gasoline engine for out-of-doors use. The gear pump is mounted integrally with operating valve.

13. Magnetic Separator

Designed for the concentration of finely divided magnetic ores, the cone wet type continuous magnetic separator, made by Magnetic Engineering & Mfg. Co., Clifton, N. J., also has application for removal of magnetic particles from cutting oils and separation of minute iron particles in solution.

Material to be separated is fed to the top of the magnetic separator. Separation is made in the machine and the magnetic material is discharged from one outlet and the nonmagnetic from another. Machine is built in sizes ranging from 2 to 10 feet in diameter and in multiples from one to four stages in operation.

14. Centerless Grinders

Two fully automatic internal centerless grinders designed for mass production and high precision on medium to large sized work which can be rotated on its outside diameter while grinding the bore are announced by Heald Machine Co., Worcester 6, Mass. Features common to both machines include: Feed mechanism arranged so that rate and amount of roughing and finishing feeds and amount of retraction and compensation are set by graduated knobs; protected antifriction ways; wheelhead belt tension shown on indicators; permanent lubrication of workhead and grinding head.

Maximum outside diameter of work for model 281 and 381 is 4½ and 9 inches respectively. Maximum hole length which may be ground is 3 and

VITAL TOOL FOR *Management!*

Use it to *SPREAD* the national debt!

WITH MANAGEMENT BACKING, PAYROLL SAVINGS PLAN CAN HELP BUSINESS AND NATION

In 19,000 companies, the Payroll Savings Plan (for the regular purchase of U. S. Savings Bonds) has made employees more contented in their jobs—has cut down absenteeism—has even reduced accidents!

In addition, of course, the Plan builds financial security for each participant. Each Bond pays $4 at maturity for every $3 invested.

But the Plan has other, far-reaching benefits—to business and to the nation—which are equally important to you.

SPREADING THE NATIONAL DEBT HELPS SECURE YOUR FUTURE

The future of your business is closely dependent upon the future economy of your country. To a major extent, that future depends upon management of the public debt. Distribution of the debt as widely as possible among the people of the nation will result in the greatest good for all. How that works is clearly and briefly described in the brochure shown at the right. Request your copy—*today*—from your State Director of the Treasury Department's Savings Bonds Division.

WHY EXECUTIVE BACKING IS VITAL

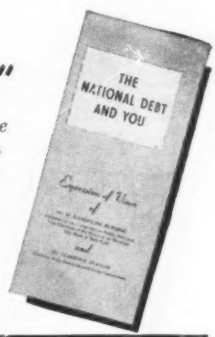
Employees still want the benefits of the Payroll Savings Plan. In fact, they *need* the P. S. P., because banks don't sell Bonds on the "installment plan"—which is the way most workers prefer to buy them. But wartime emotional appeals are gone. Human nature being what it is, the success of the Plan in your company is liable to dwindle unless a responsible executive keeps it *advertised*. The *reasons* for promoting it are as important as ever—to you, your company, and your country.

So—today—*check up* on the status of the Payroll Savings Plan in your company. *Act* on your responsibility to see that it is vigorously maintained.

The State Director will gladly help.

"The National Debt and You,"

a 12-page pocket-size brochure, expresses the views of W. Randolph Burgess, Vice Chairman of the Board of the National City Bank of New York, and Clarence Francis, Chairman of the Board, General Foods Corporation. Request your copy from the Treasury Department's State Director, Savings Bonds Division.

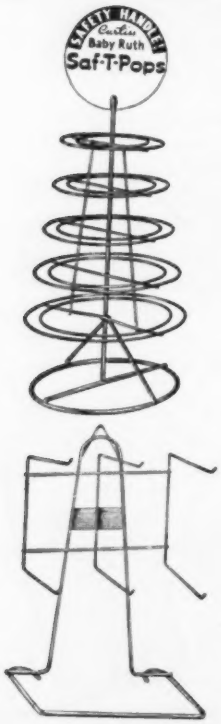


The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and the Advertising Council

KERR wire display racks*
made with
KEYSTONE WIRE



Successful merchandising depends on displaying products to the best advantage.

Display racks by Kerr Wire Products Corporation are designed for self-service. They stimulate faster buying . . . invite repeat sales . . . and no space is lost or used inefficiently.

Into Kerr racks goes dependable Keystone wire, with proper ductility for easy forming . . . clean bright surface for spot welding and plating. For these important reasons Keystone wire has been chosen to supply the proper foundation to the quality of Kerr wire products.

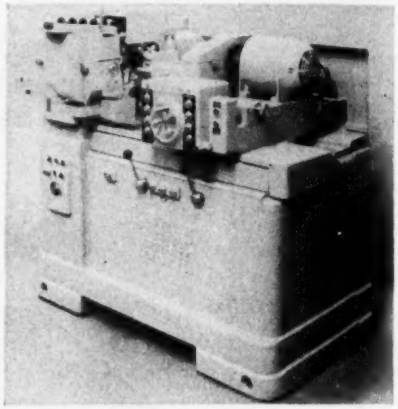
*Kerr Wire Products Co., Chicago, Ill.

KEYSTONE
MUSIC SPRING WIRE

SPECIAL ANALYSIS WIRE
for all industrial purposes

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

6 inches. Maximum diameter is ¼ and 3 inches. Table speeds are unlim-



ited between 0-30 and 0-40 feet per minute. Table travel is 8½ and 12 7/16-inches.

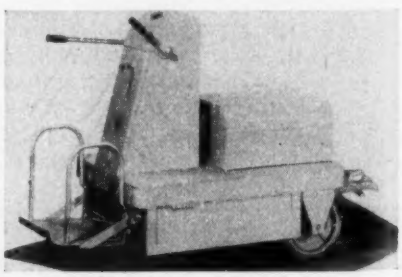
15. Hole Gage

Sixty degree center holes, as well as 82 and 90 degree countersunk holes may be accurately checked with the new Center Master gage, manufactured by Veteran Machine Works, 511 South Laflin St., Chicago 7, Ill. It aids in machining or grinding work when locating from center holes where length and size of holes must be held to close limits.

Gage gives diameter of center holes by a direct indicator reading. When gage pin enters hole, it travels a certain distance depending upon size of hole. Indicator is a predetermined distance farther from the fulcrum of the lever than the gage pin. Travel of the gage pin is translated from a depth measurement to a diameter measurement.

16. Electric Tow Unit

Maneuverability, rugged performance and low operating and maintenance cost are combined in the lightweight electric tow unit developed by Rocky Mountain Steel Products



Inc., 1360 Wall St., Los Angeles 15, Calif. Known as the Pony Express Orange tow unit, it has a 72-inch turning radius. It will haul 10,000 pounds of trailer loads three to four times faster than walking speed.

One of a series *of messages to help you increase your understanding of business paper advertising, and its effect on your business.*

Where are next year's profits coming from?

LABOR COSTS probably won't be any lower. Most materials, when you can get them, will still be costly. Yet no one in his right mind believes that profits can come from higher and higher prices. For that just makes *everybody* the loser in the end.

So the answer you hear most often is for all of us to *produce* more. To produce more efficiently. To so refine our mass production techniques that we can shave the last penny off the manufacturing cost per unit.

But that's not the *whole answer!*

The same principle must be applied to the *manufacture of a sale.* Because that's where business will find its best opportunities for profit — now and in the years to come.

With a buyers' market already in sight, it is time for business to re-examine the whole process of selling and distribution, and to improve the techniques of marketing its goods and services. The job is a tough one. It calls for streamlining, for more *mechanization* —which is simply another name for more aggressive and efficient advertising.

Skillfully employed, advertising is to selling what the assembly line is to production. It is a machine that increases the capacity of the sales force by the hundreds, or thousands, or by any quantity your market requires—exploring the field, arousing interest, creating a preference for your company and its products.

And nowhere does this machine operate at *higher efficiency* than in the business press, where it is concentrated among your best prospects—and no one else!

What are the ten ways to measure the results of your business paper advertising? You'll find the answers in a recent ABP folder, which we'll be glad to send you on request. Also, if you'd like reprints of this advertisement (or the entire series) to show to others in your organization, you may have them for the asking.

STEEL

is one of the 129 members of The Associated Business Papers, whose chief purpose is to maintain the highest standards of editorial helpfulness—for the benefit of reader and advertiser alike.

MOTORIZED HAND-LIFT TRUCKS
ARE BETTER WITH READY-POWER

gas-electric
power units

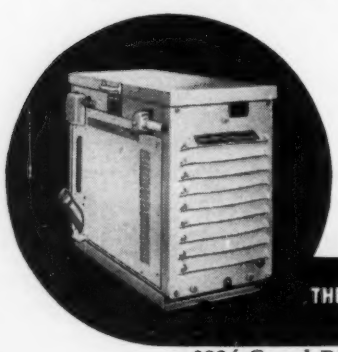
- MAXIMUM EFFICIENCY
- FULL ELECTRIC DRIVE
- CONTINUOUS POWER
- VARIABLE SPEED OPERATION
- COMPLETE AND SELF-CONTAINED

Ready-Power-equipped Motorized Hand-Lift Truck "inching" a load into a box car.

Ready-Power has been *preferred* power for electric industrial trucks for over two decades. The superior performance, long life and dependability of Ready-Power has earned the high regard of practical material movers.

Now, after long, careful development, Ready-Power is available for Motorized Hand Lift Trucks. In Ready-Power Model "Z" Units, specially developed for this service, all the desirable features of Ready-Power become available for the users of these small, hard working material handlers.

Bulletin No. 114 describing Model "Z" Units will be mailed to you on request.



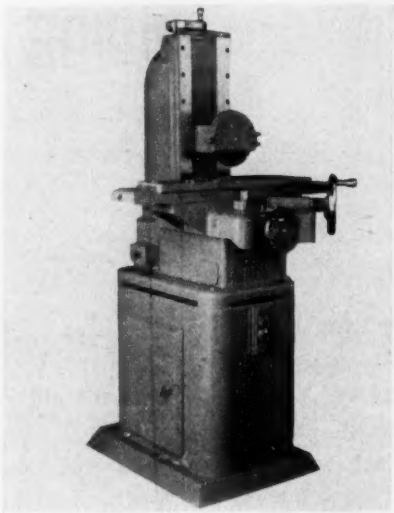
THE READY-POWER CO.

3824 Grand River Ave., Detroit 8, Michigan

Operator of unit can face in either direction, saving time in approaching, engaging a trailer and maneuvering. Wheel base is 30 inches. Power is furnished by either a 24 or 32 volt battery, depending upon speed desired and draw bar pull required.

17. Surface Grinder

Tools, dies, chip breakers may be ground and other toolroom jobs performed with the hand-feed surface grinder, the Excel No. 7, made by Covel Mfg. Co., Benton Harbor, Mich. Convenient grouping and location of controls offers maximum accessibility from any working position. In setting up a job the operator has



only to bring the wheel to the work and begin grinding. A ball bearing sealed-for-life spindle insures fine finishes.

Smooth table operation is accomplished through hardened spiral pinion and rack. Ways are dust protected and motor is enclosed in base. Floor and bench types are available. A Walker or Brown & Sharpe No. 510 chuck may be used.

18. Heat Treating Furnace

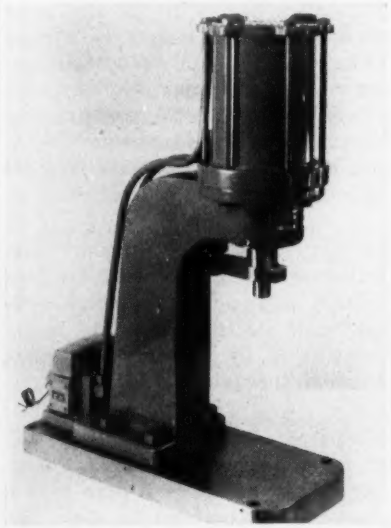
Ability to perform most heat treating operations involving temperatures up to 1850° F, is claimed for the Treet-All small multipurpose furnace, developed by Hevi Duty Electric Co., Milwaukee 1, Wis. A box type furnace into which a fabricated Inconel muffle and gasketed door has been incorporated comprises the furnace. Inlet and exhaust openings are provided to permit use of an atmosphere in the unit. Normally a flow of 10 cubic feet per hour will maintain the atmosphere.

Carburizing, dry cyaniding and scale-free, nondecarburized harden-

ing operations may be performed. Raw gases such as methane may be used without affecting heating elements because of the Inconel muffle. An optional feature is a quench tank with two compartments.

19. Arbor Presses

Two air operated, fast operating, semiautomatic arbor presses are being manufactured by Hannifin Corp., 1101 South Kilbourn Ave., Chicago, Ill. Both feature a pushbutton controlled electric valve which eliminates



manual valve operation and speeds up the operating cycle.

Model M-1 has a 4½-inch diameter, 4-inch stroke air cylinder and develops up to 1270 pounds ram pressure with 80-pound air line pressure. Cylinders measure 6½-inches in diameter and have a 6-inch bore on model M-2. Ram pressures may be up to 2650 pounds. Stroke may be varied in both models. Gap distance from table to ram up is 6 and 12¼-inches respectively. Both of these semiautomatic arbor presses are designed for bench mounting.

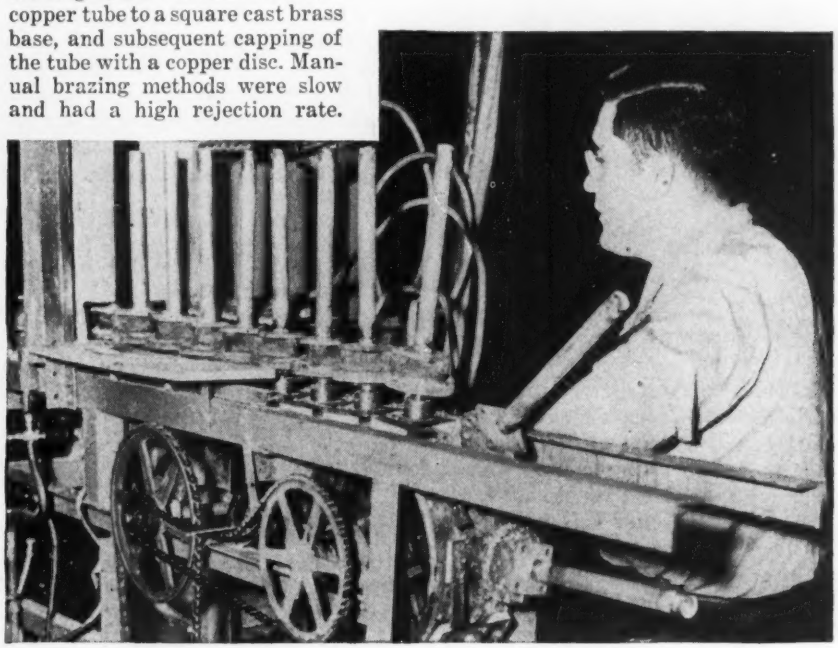
20. Crane Truck

Introduction of a crane truck with a 40-foot reach is announced by Yale & Towne Mfg. Co., 405 Lexington Ave., New York 17, N. Y. Boom is constructed in 10 foot sections, making possible use of 20 and 30 foot booms when center sections are removed. Truck has electric elevating and booming limit controls, wide traction and trailer tires and a 270 degree steering range.

Capacities of boom at full length are 4500 pounds at 7 foot outreach, 3620 pounds at 9 feet and 2000 pounds at 19 feet. At its shortest length, the boom has a capacity of

JUMPED PRODUCTION from 1000 to 2000 units per day

TRENT, INC., of Philadelphia, Pa., needed to speed up the brazing of a 1-inch OD x 10-inch copper tube to a square cast brass base, and subsequent capping of the tube with a copper disc. Manual brazing methods were slow and had a high rejection rate.



Wm. E. Johnson, Airco Technical Representative, recommended the building of an automatic brazing machine, designed to fit the particular operation. Now, using this machine, both joints are brazed simultaneously. The Trent Company has jumped production from 1000 to 2000 units per day, and rejections have dropped 60%. The machine was designed to accept almost all of Trent's large production brazing jobs with variable speeds to allow for a full and complete range of heating requirements.

• • • •

Technical Sales Service—though not a packaged commodity—is as readily available to all industry as any Airco process or product. If you have a metal working problem, ask to have a Technical Sales Division man call. Address Dept. S-8051, Air Reduction, 60 East 42nd St., New York 17, N. Y. In Texas: Magnolia Airco Gas Products Co., Houston 1, Texas. On West Coast: Air Reduction Pacific Company, San Francisco 4, California.

AIRCO **AIR REDUCTION**

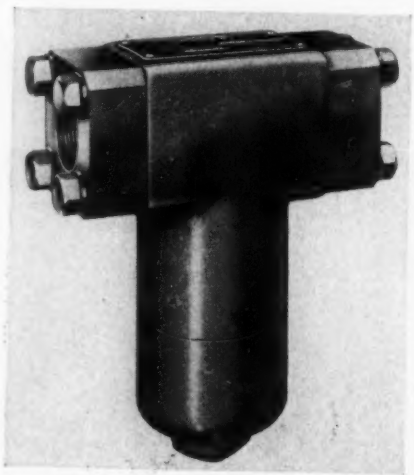
Offices in All Principal Cities

TECHNICAL SALES SERVICE—ANOTHER AIRCO PLUS-VALUE FOR CUSTOMERS

10,000 pounds. Use of outriggers assists in hoisting capacities up to 10,000 pounds.

21. Oil Filter

Using a venturi design, a new proportional type oil filter, made by Vickers Inc., 1480 Oakman Blvd., Detroit 32, Mich., features a cartridge which filters out particles down to 2 microns in size (0.000078-inch). Reversible filtering action with equal

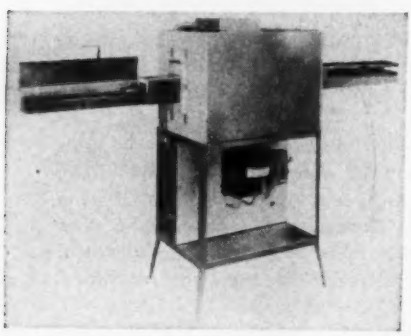


efficiency in either direction meets requirements of closed circuits.

Use of a by-pass valve is not necessary as the venturi action controls maximum pressure built up across the cartridge. Filter may be installed in any horizontal hydraulic system pressure line. It has no moving parts. Maintenance is limited to a periodic replacement of the disposable cartridge.

22. Tunnel Kiln

A tunnel kiln for small batch production work, firing of ceramic parts and production heat treating of small parts is announced by K. H. Huppert Co., 6830 Cottage Grove Ave., Chi-



cago 37, Ill. Small refractory trays are pushed through the inside of the pusher type kiln's 33-inch firing chamber by means of a variable speed drive. The firing zone, electrically heated to a maximum of 2200°F, is actually 10 inches long.

Kiln is equipped with a No. 221 Wheelco Capacitrol for automatic temperature control, fused switch box and step-down power transformer. It operates on single phase, 110 or 220 volt alternating current. Current consumption is 2 kilowatts.

DEVELOPED BY . . .

23. Kennametal Inc., Latrobe, Pa., corrosion resistant grade K501 tungsten carbide, made using a platinum cementing metal. Use may be as valve tips and inserts, balls, nozzles, rotary seals, etc.

24. Westinghouse Electric Corp., Pittsburgh 30, Pa., two basic types of Sturtevant axial flow pressure fans—straight-through and convertible elbow types. Displacement is from 2000 to 115,000 cubic feet per minute.

25. Mine Safety Appliances Co., Pittsburgh 8, Pa., model B velocity power driver for anchoring pipe hanger and conduit boxes to structural plate or concrete. A blank cartridge supplies power to drive headed or threaded studs.

26. Safety First Supply Co., Pittsburgh 19, Pa., a metal reinforced wood maul with cross-bolted aluminum eye joining hardwood head and handle. It is made in three models with varying weights and head and handle measurements.

27. Milton Roy Co., 1308 East Mermaid Ave., Philadelphia 18, Pa., the Constametric piston type pump for handling liquids in precisely controlled volume, down to as little as 75 ml per hour. Interchangeable gears vary capacity.

28. United Electric Motor Co., New York 13, N. Y., portable safety ventilator of aluminum, electric motor driven, which has a 425 cubic feet per minute capacity.

29. Adel Precision Products Corp., Burbank, Calif., a gear type, hydraulic oil pump for 1000 pounds per square inch service. Models are available with capacities at 1800 revolutions per minute, from 1.5 to 60 gallons per minute.

30. Black & Webster Inc., 126 Massachusetts Ave., Boston, Mass., model SA foot switch with its pivot under the arch of the foot so that rocking motion is less tiring. Ratings are for 110, 220, 440 and 50 volts.

31. Machinery Lubricants Inc., Boston 16, Mass., Silver-Chip No. 2 grinding compound for steel, copper, aluminum and brass. It is nonrusting, cleaner and translucent. Use means less wheel dressing, smoother finish.

32. Tracerlab Inc., Boston 10, Mass., the "64" scaler for radioactivity measurment. Scales from 8 to 64 are incorporated. High voltage power supply is variable between 600 and 1800 volts.

33. Swallow Airplane Co., Wichita, Kan., lock nut with replaceable locking unit which may be used with either fiber or metal washers. Full holding strength is restored by replacing locking unit retained in crown of nut.

34. National Electric Products Corp., Pittsburgh 19, Pa., pressed steel connectors and couplings designed for use with electrical metallic tubing. Gripping is by an embedding screw working through a boss.

35. Extractor Corp., Detroit 19, Mich., an inspection light for quantity inspection of small deep holes in machined or cast parts. Good visibility is obtained in holes ⅛-inch in diameter and 6 inches deep or ¼-inch diameter and 30 inches deep.

36. Shearcut Tool Co., Box 746, Reseda P. O., Los Angeles, Calif., presharpened tool bit which cuts metal with knife-like action. Tool uses the chip removed in cutting, keeping the tool sharp.

37. Precision Scientific Co., Chicago 47, Ill., magnetic stirrers, one operated electrically, the other by air, for agitating liquids under pressure, in a vacuum or in a closed system. Rotating magnetic field induces variable speed.

38. Pyrometer Instrument Co., 103 Lafayette St., New York, N. Y., a radiation pyrometer for determining temperatures above 1000° F by thermo-electric principle. Self-contained instrument is direct reading.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

PRODUCTION HIT—Old Man Winter played hob with steel and metalworking plant operations at various important manufacturing centers last week. Zero weather, resulting in shortages of gas and oil for industrial use, forced closing of some plants and curtailment of activities in others at such important centers as Pittsburgh, Youngstown and Cleveland.

Production schedules at steel finishing mills were curtailed at Pittsburgh due to cutting off of gas to industrial applications. Ice conditions in the rivers at Pittsburgh threatened to seriously curtail industrial operations if prolonged, with shipments of coal to district steel plants hampered. This threat also extended to plants in Youngstown. Throughout Pennsylvania and northern and eastern Ohio, industry was forced to draw heavily upon standby fuel supplies.

INGOT OPERATIONS—Steelmaking operations declined 1 point last week to 95.5 per cent of capacity. This was due not only to adverse weather conditions but also to continued shortages of raw materials. The week's schedule was equivalent to production of about 1,720,000 tons. Operations dropped 11½ points to 78 per cent in St. Louis, 7 points to 81.5 in Buffalo, 4 points to 83 per cent in New England, 3 points to 97 in Cincinnati, and ½ point to 92.5 in Chicago. The rate rose 2½ points in Cleveland to 97 and 1 point in the Detroit and eastern Pennsylvania districts to 92 and 91 per cent, respectively.

STEEL ALLOCATION—Details of the voluntary steel allocation program will require some time to formulate. Last week the program appeared to be shaping up at a snail's pace. Indications now are no broad allocation outside a few essential industries is likely, and the tonnage of steel involved in such distribution above current programs is not likely to exceed 2 million tons.

Despite the slow progress to date, most steel producers think the broad pattern for allocation will be sufficiently clarified soon to permit setting up consumer quotas for second quarter. Downward revisions appear certain.

PRICES RISING—Adjustments continue by individual producers on various iron and steel products, but no sign has yet appeared of any general advance. Last week one interest raised bright basic wire $4 per ton, another upped wire rods $10 per ton, galvanized and electrical sheets went up $7 per ton, coating extras were raised 60 cents to $2 per ton reflecting the recent increase of 1½ cents per lb. on zinc, and cast iron pipe advanced $5 per ton.

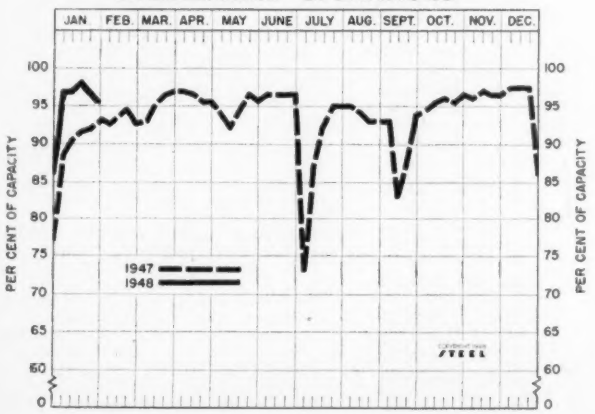
Composite market price averages, as compiled by STEEL, increased to $78.59 last week from $78.41 the previous week and compared with $69.82 a year ago on finished steel; to $65.60 from $65.10 and $52.10, respectively, for semifinished steel; and to $39.23 from $39.16 and $29.56 for steelmaking pig iron. Steelmaking scrap composite declined, however, to $41.08 from $41.92 the previous week.

RAW MATERIALS — Continued shortage of scrap and pig iron is handicapping operations at steel mills and foundries. The latter anticipate little improvement in average weekly receipts of pig iron over coming weeks.

As regards scrap, the movement to mill yards is below current consumption. At some points open-hearth furnaces are being taken off for lack of material.

STEEL DEMAND PRESSING—Demand for the major products continues in excess of supply, but here and there some slight easing is noted. In the main, however, consumers are not getting as much steel as they desire and the uncertainty over voluntary allocations is tending to increase shipment pressure. Meanwhile, many metalworking shops are seeking to augment supplies by purchasing on the "gray" market.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Jan. 31	Change	Same Week 1947	Same Week 1946
Pittsburgh	95.5	None	100.5	1.5
Chicago	92.5	— 0.5	90	5
Eastern Pa.	91	+ 1	88	4
Youngstown	103	None	88	0
Wheeling	93.5	None	89	56
Cleveland	97	+ 2.5	95	0
Buffalo	81.5	— 7	90.5	0
Birmingham	100	None	99	0
New England	79	— 4	84	10
Cincinnati	97	— 3	91	44
St. Louis	78	—11.5	62	19
Detroit	92	+ 1	92	32
Estimated national rate	95.5	— 1	93	5.5

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Jan. 31	Jan. 24	Month Ago Dec. 1947	Year Ago Jan 1947	5 Years Ago Jan. 1943
Finished Steel	$78.59	$78.41	$76.15	$69.59	$56.73
Semifinished Steel	65.60	65.10	57.20	49.98	36.00
Steelmaking Pig Iron	39.23	39.16	36.31	29.56	23.00
Steelmaking Scrap	41.08	41.92	40.13	31.20	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Nov. 1947	3.47536c
Oct. 1947	3.45536c
Nov. 1946	2.87671c
Nov. 1942	2.36750c

* Straight Arithmetical Composites: Computed from average industry-wide base prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading basing points), and on Steelworks Scrap (No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Finished Steel arithmetical composite, dollars per net ton on net ton basis; others, gross ton.

† Finished Steel Weighted Composite: Computed in cents per pound, base prices, weighted by actual monthly shipments of following products, representing 81 per cent of total steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates; standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Materials

	Jan. 31, 1948	Dec., 1947	Oct., 1947	Jan., 1947
Steel bars, Pittsburgh	2.90c	2.90c	2.90c	2.60c
Steel bars, del. Philadelphia	3.356	3.318	3.30	2.975
Steel bars, Chicago	2.90	2.90	2.90	2.60
Shapes, Pittsburgh	2.80	2.80	2.80	2.46
Shapes, del. Philadelphia	2.968	2.954	2.947	2.60
Shapes, Chicago	2.80	2.80	2.80	2.47
Plates, Pittsburgh	2.95	2.95	2.95	2.61
Plates, del. Philadelphia	3.19	3.17	3.16	2.77
Plates, Chicago	2.95	2.95	2.95	2.62
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Pittsburgh	3.95	3.90	3.90	3.55
Sheets, hot-rolled, Gary	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Gary	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Gary	3.95	3.90	3.90	3.55
Strip, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.50
Strip, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.20
Bright basic, bess. wire, Pittsburgh	3.775	3.675	3.675	3.425
Wire nails, Pittsburgh	4.70	4.625	4.25	4.062
Tin plate, per base box, Pittsburgh	$6.70	$5.75	$5.75	$5.75

Semifinished

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$60.00	$47.60
Slabs, Pittsburgh, Chicago	47.50	47.50	47.50	41.40
Rerolling billets, Pittsburgh	47.50	47.50	47.50	41.40
Wire rod 7/32 to 1/4-inch, Pitts.	3.175c	3.05c	2.925c	2.55c

Pig Iron

	Jan. 31, 1948	Dec., 1947	Oct., 1947	Jan., 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$40.996	$37.913	$37.879	$31.815
Basic, Valley	39.00	36.00	36.00	30.00
Basic, eastern del. Philadelphia	42.004	38.84	38.78	31.99
No. 2 fdry., del. Pgh. (N.&S. sides)	40.496	37.413	37.379	31.315
No. 2 fdry., del. Philadelphia	42.504	39.34	39.28	32.49
No. 2 foundry, Chicago	39.00	36.00	36.00	30.50
No. 2 Foundry, Valley	39.50	36.50	36.50	30.50
Southern No. 2, Birmingham	37.88	34.88	34.88	26.88
Southern, No. 2, del. Cincinnati	40.74	37.74	38.544	31.75
Malleable, Valley	39.50	36.50	36.50	30.50
Malleable, Chicago	39.50	36.50	36.50	30.50
Charcoal, low phos., fob Lyles, Tenn.	55.00	50.00	46.40	37.50
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	151.00	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.50	$40.00	$39.90	$32.50
Heavy melt. steel, No. 2, E. Pa.	43.50	41.625	39.50	31.00
Heavy melt. steel, No. 1, Chicago	39.25	38.75	39.55	30.00
Heavy melt, steel, No. 1, Valley	40.25	39.75	39.50	32.50
Heavy melt. steel, No. 1, Cleveland	39.75	39.25	38.25	31.88
Heavy melt. steel, No. 1, Buffalo	43.50	42.50	39.00	30.88
Rails for rerolling, Chicago	60.00	58.625	51.00	36.25
No. 1 cast, Chicago	63.50	55.875	46.40	41.50

Coke

Connellsville, beehive furnace	$12.50	$12.25	$12.15	$8.81
Connellsville, beehive foundry	14.75	14.50	14.50	9.81
Chicago, oven foundry, del.	19.25	18.975	18.52	15.95

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $90-$95. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $45-$50, sales by smaller interests on negotiated basis at $85 or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $55-58; Detroit, del., $61.20; eastern Mich., $62.60.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69.20, eastern Mich., $70.60.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60 nom.; sales in open market $95-$105.

Skelp: Pittsburgh, Youngstown, 2.60c-2.65c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-70.

Wire Rods: Pittsburgh, Chicago, Birmingham, 7/32 to 1/4-inch, inclusive, $2.80-3.55 per 100 lb. 5/16 to 47/64-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.52.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, base, 20 tons one size, 2.90c; Detroit, del., 3.06c; eastern Mich., 3.13c; New York, del., 3.392c; Phila., del., 3.356c; San Francisco (base, del.), 3.63-3.95c; Los Angeles (base, del.), 3.625-3.86c; Seattle, 3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.71c; Toledo, 3.78c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c; Detroit, del., 4.26c; eastern Mich., 4.33c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.33c; Los Angeles (base, del.), 3.325c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo. Prices upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c, double refined 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

† Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Granite City, 3.175c; Detroit, del., 2.96c; eastern Mich., del., 3.03c; Philadelphia, del., 3.04c; New York, del., 3.172c; Los Angeles (base, del.), 3.54c; San Francisco, (base, del.), 3.545c. (Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.71c; Eastern Mich., del., 3.78c; New York, del., 4.042c; Philadelphia, del., 4.006c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, 3.95c; Youngstown, Sparrows Point, Canton, Middletown, base, 3.95c; Granite City, 4.35c; New York, del., 4.322c; Philadelphia, del., 4.19c; Los Angeles (base, del.), 4.62c; San Francisco (base, del.), 4.625c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.55c; copper-iron or pure iron, 4.90c Granite City 5.00c and 5.35c, respectively. Los Angeles (base, del.), 5.24c; San Francisco (base, del.), 5.245c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Stainless-Clad 20%: Pittsburgh, Washington, Coatesville, Pa., No. 304, 22.00c; No. 410, 20.00c; No. 430, 20.50c; No. 446, 27.00c. Prices include annealing and pickling.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 3.95c; Granite City, 4.05c; Detroit, del., 4.11c; eastern Mich., 4.18c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. **Armature:** Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., 5.25c; Kokomo, Ind., 4.90c. **Electrical:** Pittsburgh, Chicago, Gary, 5.30c; Granite City, Ill., 5.75c; Kokomo, Ind., 5.40c. **Motor:** Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.50c. **Dynamo:** Pittsburgh, 6.75c; Granite City, 7.20c. Transformer 72, 7.25c; 65, 7.95c; 58, 8.65c; 52, 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, d..., 2.96c; eastern Mich., del., 3.03c; San Francisco (base, del.), 3.605c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.71c; eastern Mich., 3.78c; Worcester, base, 3.75c-4.45c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c; over 0.60 to 0.80, 5.65c; over 0.80 to 1.05, 7.15c; over 1.05 to 1.35, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., per base box of 100 lb, 1.25 lb coating $6.60, 1.50 lb coating $6.80; Granite City, Birmingham, Sparrows Point, 1.25 lb coating $6.70, 1.50 lb coating $6.90.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 0.25 lb tin, $5.80, 0.50 lb tin, $6.00; 0.75 lb tin $6.20; Granite City, Birmingham, Sparrows Point, $5.90, $6.10, $6.30, respectively.

Can Making Black Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 0.55 to 0.70 lb tin, $5.20; 0.75 to 0.95 lb tin, $5.10; 100 to 128 lb tin, $5.20.

Holloware Enameling Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage, 4.75c per lb; Granite City, Birmingham, Sparrows Point, 4.85c per lb.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, per base box of 100 lb, $5.90; Granite City, Birmingham, Sparrows Point, $6.00.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, 3.45c; Claymont, 3.65c; Geneva, Utah, (base, del.), 3.125c; Det., del., 3.21c; New York, del. 3.322c; Phila., del., 3.19c; Boston, del., 3.423c; St. Louis, del. 3.269c; San Francisco and Los Angeles, del., 3.67c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif.
(Central Iron & Steel Co., Harrisburg, Pa. 4.75c, basing points.)

Floor Plates: Pittsburgh, Chicago, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.80c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; **monel-clad, 24.00c. Pittsburgh, Washington,** Coatesville, Pa., 20% stainless-clad, base prices including annealing and pickling: No. 304, 24.00c; No. 410, 22.00c; No. 430, 22.50c; No. 443, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.088c; Phila., del., 2.968c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41c-3.47c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.52c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer	*$3.55-4.00
Basic MB Spring (except Birm.)	**$4.95
Upholstery Spring (except Birmingham)	†$4.60

Wire Products to Trade in carloads

Wire, Merchant Quality Annealed (6 to 8 base)	††$4.20
Galvanized (6 to 8 base)	††$4.65

(Fob Pittsburgh, Chicago, Duluth, Birmingham, per base column).

Nails Standard, cement-coated, galvanized	‡94
Staples, polished and galvanized	‡94
Woven fence, 15 gage and heavier	$100
Barbed wire, 80-rod spool	‡‡113
Fence Posts (with clamps)	107
Bale ties, single loop	99

* Worcester, $3.65, Duluth, $3.60, base, San Francisco (base, del.), $4.56, bright basic only.

** Worcester, $5.05; Duluth & Trenton, N.J., $5.20 (bright only); San Francisco (base del.) $5.63.

† Worcester $4.70, Duluth and Trenton, N. J., $4.85, base. San Francisco (base, del.) $5.28 black upholstery.

‡ Worcester 100; San Francisco (base, del.) 115.

§ San Francisco (base del.) 123.

‡‡ San Francisco (base del.) 133.

†† Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed, $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66 galvanized.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.
Relaying, 60 lb and over fob warehouse $60-$65 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.65 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars $3.85 per 100 lb, fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles, 4.50c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	46	19½	1	56	41½
¼	47	25	1¼	56½	42
⅜	44	22	1½	57	42½
½	50½	34½	2	57½	43
¾	53½	38½	2½ & 3	58	43½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	49	34	48½	33½	48	33
2½-3	52	37	51½	36½	51	36
3½-6	54	39	53½	38½	53	38

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	45	1	55
¼	46	1¼	55½
⅜	43	1½	56
½	49½	2	56½
¾	52½	2½ & 3	57

In.	Lap Weld	Elec. Weld	Seamless
2	48	47½	47
2½ & 3	51	50½	50
3½-6	53	52½	52
8	53½	53	52½
10	53	52½	52
12	52	51½	51

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		——Seamless——		—Elec. Weld—	
O.D. Sizes	B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1"	13	....	$11.87	$11.51	$11.51
1¼"	13	....	14.06	11.48	13.64
1½"	13	$13.08	15.69	12.69	15.22
1¾"	13	14.88	17.85	14.43	17.31
2"	13	16.67	19.99	16.17	19.39
2¼"	13	18.58	22.29	18.02	21.62
2½"	12	20.47	24.54	19.86	23.80
2¾"	12	22.42	26.87	21.75	26.06
3"	12	23.76	28.48	23.05	27.63
3¼"	12	24.93	29.90	24.18	29.00
3½"	11	29.03	34.81	28.16	33.77
4"	11	31.17	37.39	30.23	36.27
4½"	10	38.69	46.38	37.53	44.99
5"	9	51.28	61.50	....	....
6"	9	59.39	71.18	....	....
	7	91.13	109.27	....	....

Pipe Cast Iron: Class B, 6-in. and over $79.50 per net ton, Birmingham; $84.50, Burlington, N. J.; $91.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ⅝ x 6-in. and shorter	46 off
¾-in. and larger x 6-in. and shorter	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 on on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅛-in. and smaller	46 off	....
¼-in. and smaller	....	44 off
½-in.-1-in.	44 off	....
⅛-in.-1-in.	....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	48 off
¾, ⅞, & 1 x 6 and shorter	44 off

Square Head Set Screws

Upset 1-in. and smaller	57 off
Headless, ¼-in. and larger	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger	5.65c
Lebanon, Pa.	5.80c
⅞-in. and under	55 off
Lebanon, Pa.	55 off plus 15c per cwt

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers lcl ..... $1-$2 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	89.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
†501	9.00	13.00	17.50	13.00	18.50
†502	10.00	14.50	18.50	14.50	19.50
‡STAINLESS CLAD STEEL (20%)					
304	....	24.00	22.00	....	....
410	....	22.00	20.00	....	....
430	....	22.50	20.50	....	....
446	....	29.00	27.00	....	....

† Low chromium. ‡ Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$40.00	$40.50	$41.00	$41.50
Newark, N. J., del.	42.208	42.708	43.208	43.708
Brooklyn, N. Y., del.	....	44.10	44.60	....
Philadelphia, del.	42.004	42.504	43.004	43.504
Birmingham, base	35.88†	36.38†	....	....
Cincinnati, del.	....	40.74	....	....
Buffalo, base	40.00†	40.00†	40.50†	41.00
Boston, del.	47.776	47.776	48.276	....
Rochester, del.	42.22	42.22	42.72	43.22
Syracuse, del.	43.025	43.025	43.525	44.025
Chicago, base	38.50	39.00	39.50	40.00
Milwaukee, del.	40.08	40.58	41.08	41.58
Muskegon, Mich., del.	....	43.60	44.10	....
Cleveland, fob furnace	38.50†	39.00†	39.50†	40.00
Akron, del.	40.50	41.00	41.50	42.00
Duluth, base	39.00	39.50	40.00	40.50
Erie, Pa., base	38.50	39.00	39.50	40.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	39.50	40.00	40.50	....
St. Louis, del.	40.33	40.83	....	....
‡**Neville Island, Pa.,** base	39.00	39.50	39.50	40.00
Pittsburgh, del., N.&S. Sides	39.996	40.496	40.496	40.996
Provo, Utah, base	39.00	39.50	....	....
Seattle, Tacoma, Wash., del.	....	46.63	....	....
Portland, Oreg., del.	....	46.63	....	....
Sharpsville, Pa., base	39.00	39.50	39.50	40.00
Steelton, Pa., base	40.00	40.50	41.00	41.50
Struthers, O., base	39.50	....	....	....
Swedeland, Pa., base	45.00	45.50	46.00	46.50
Toledo, O., base	38.50	39.00	39.50	40.00
Cincinnati, del.	42.70	43.20	....	....
Youngstown, O., base	39.00	39.50	39.50	40.00
Mansfield, O.	42.57	43.07	43.07	43.57

† Republic Steel Corp. quotes $3 a ton higher at Birmingham, effective Jan. 1, 1948; Republic quotes $3 higher for No. 2 foundry and malleable and $2.50 higher for basic at Buffalo, and $1.25 higher at Cleveland, effective on shipments during week ended Feb. 1.

‡ To Neville Island base add: 79.2c for McKees Rocks, Pa., $1.212 Lawrenceville, Homestead, McKeesport, Monaco; $1.788 Oakmont; $1.596 Verona; $1.788 Brackenridge; 99.6c to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$47.50
6.51-7.00..$48.75 9.01- 9.50. 55.00
7.01-7.50.. 50.00 9.51-10.00. 56.25
7.51-8.00.. 51.25 10.01-10.50. 57.50
8.01-8.50.. 52.50 10.51-11.00. 58.75
8.51-9.00.. 53.75 11.01-11.50. 60.00

Fob Jackson, O., per gross ton; Buffalo base $3.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron: Si 14.01-14.50%, $77.50, Jackson, O.; $78.75, Niagara Falls; $78 open-hearth and $79 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn....$55.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $39.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $46.00. Philadelphia, $48.592, delivered. Intermediate phosphorus, Central furnace, Cleveland, $42.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$13.00
Connellsville, foundry	14.00- 15.50
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$18.75
Chicago, outside del.	18.00
Chicago, del.	19.25
Terre Haute, ovens	18.50
Milwaukee, ovens	18.75
New England, del.	19.60
Birmingham, del.	15.76
Indianapolis, ovens	18.50
Cincinnati, del.	18.95
Ironton, O., ovens	16.75
Erie, Pa., del.	19.45
Painesville, O., ovens	18.10
Cleveland, del.	19.60
Buffalo, del.	19.85
Detroit, del.	19.00
Philadelphia, ovens	17.75
Swedeland, Pa., ovens	17.75
Portsmouth, O., ovens	17.00

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	21.00†
Toluol, two degrees	28.00
Industrial xylol	28.00
Solvent naphtha	28.00

Per pound fob works

Phenol (car lots, returnable drums)	12.50
Do., less than carlots	13.25
Do., tank cars	11.50

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	11.00

Per ton, bulk, fob plants

Sulphate of ammonia	$40.00

† Freight allowed up to 2 cents.

Refractories

Net Prices

Per 1000, fob shipping point

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$92.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	73.00
Ala., Ga.	73.00
N. J.	78.00

Intermediate Heat Duty

Ohio	67.00
Pa., Ill., Md., Mo., Ky.	67.00
Ala., Ga.	59.00
N. J.	70.00

Low-Heat Duty

Pa., Md., Ohio	59.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	50.00
Wire Cut	48.00

Malleable Bung Brick

All bases	$3.00

Silica Brick

Pennsylvania	73.00
Joliet, E. Chicago	82.00
Birmingham, Ala.	73.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	64.00
Chem. bonded chrome	64.00
Magnesite brick	86.00
Chem. bonded magnesite	75.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	27.00
Single bags	31.50

Dolomite

Domestic, dead-burned, bulk, net tons, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.20

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%.	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 65.00-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	28.50
50% no ratio	29.50
48% 3:1 lump	43.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheet, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	5.85	...	...	...	...	...	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30†	5.30†	5.30	...	...	...	...	...
Shapes, structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

† Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½"& up	H-R Alloy (**4140)	Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
Boston (city)	4.96	6.03[4]	5.73[4]	6.16[4]	7.41[4]	5.04	6.73	4.95	5.63	7.22	4.82	5.11	6.79
New York (city)	4.96	6.18	5.88	6.16	7.41	5.59	....	5.08	5.63	7.23	4.78	5.11	6.82
New York (country)	4.81	6.03	5.73	6.01	7.26	5.44	....	4.93	....	....	4.63	4.96	6.67
Philadelphia (city)	4.71	6.33	5.93	5.91	7.16	4.83	5.73	4.88	5.58	7.17[9]	4.57	4.86	6.33
Philadelphia (country)	4.61	6.23	5.83	....	....	4.73	5.63	4.78	....	....	4.47	4.76	6.23
Baltimore (city)	4.33†	5.96	5.66	5.73	6.98	4.81	....	4.86	5.56	....	4.73	4.78	6.31
Baltimore (country)	4.23†	5.86	5.56	5.50	6.75	4.71	....	4.76	....	....	4.63	4.68	6.21
Washington (city)	4.81	....	....	....	....	5.05	....	5.14	5.79[13]	....	4.95	5.03	6.60
Washington (country)	4.71	....	....	....	....	4.95	....	5.04	....	....	4.85	4.93	6.50
Norfolk, Va.	4.90	....	....	....	....	....	....	5.20	6.00	....	5.15	5.15	6.90
Memphis, Tenn. (city)	4.82[20]§§	5.87[20]†	....	6.37	....	5.02[20]	....	4.97[20]	5.87	....	4.97[20]	5.17[20]	6.87[20]
Memphis, Tenn. (country)	4.72[20]§§	5.77[20]†	....	6.27	....	4.92[20]	....	4.87[20]	5.77	....	4.87[20]	5.07[20]	6.77[20]
Buffalo (city)	4.45	....	5.20[5]	6.05	....	5.25	5.65	4.40	5.10	6.85	4.40	5.00	6.25
Buffalo (country)	4.30	....	5.05[5]	5.50	....	4.70	5.50	4.25	4.95	6.85	4.25	4.45	5.75
Pittsburgh (city)	4.25§§	....	5.70[8]†	5.65	6.90	4.35	5.35	4.40	5.10	6.85	4.40	4.60	5.90
Pittsburgh (country)	4.10§§	....	4.95[8]†	5.50	6.75	4.20	5.20	4.25	4.95	6.85	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[8]	5.20[8]	5.81	7.06	4.55	5.35	4.40	5.10	6.85	4.68	4.60	6.18
Cleveland (country)	4.30	5.35[8]	5.05[8]	....	....	....	5.20	4.25	4.95	....	....	4.45	....
Cincinnati	4.75	5.61[8]	5.31	5.76	....	4.79	....	4.79	5.49	....	4.84	4.99	6.34
Detroit	4.55	....	5.30	....	....	4.72	5.63	4.50	5.22	7.10	4.77	4.88	6.28
Indianapolis	4.55	5.32[8]	....	5.87	7.12	4.65	5.90	4.70‡‡	5.40	8.85	4.70	4.90	6.35
Chicago (city)	4.45	5.50[8]	5.20[8]	5.65	6.90	4.35	5.45	4.40	5.10	6.85[9]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[8]	5.05[8]	5.50	6.75	4.20	5.30	4.25	4.95	6.85[9]	4.25	4.45	5.90
Milwaukee	4.658	5.708[8]	5.408[8]	5.858	7.108	4.558	5.658	4.608	5.308	7.208[9]	4.608	4.808	6.258
St. Louis	4.78	5.83[9]	5.53[9]	6.02	7.27	4.68	5.82	4.73	5.47[13]	....	4.73	4.93	6.38
Birmingham (city)	4.45[20]§§	....	....	5.65	....	4.45[20]	....	4.40[20]	5.93[23]	....	4.40	4.65	6.86
Birmingham (country)	4.30[20]§§	....	....	5.50	....	4.30[20]	....	4.25[20]	....	....	4.25	4.50	....
New Orleans	4.98[20]**	....	6.29[18]	....	....	5.18[20]	....	5.13[20]††	6.29[11]	....	5.03[20]††	5.33[10]	7.29[18]
Omaha, Nebr.	5.462	....	....	6.662	7.912	5.362	....	5.412	6.112	7.562	5.412	5.612	7.062
Houston, Tex.	5.75	....	....	7.36	8.10	6.00	....	5.35	7.00[12]	....	5.85	5.85	6.50
Los Angeles (city)	5.75	7.75[9]	7.45[8]	7.40	8.80	6.05	8.70	5.50	7.35[21]	9.35[10]	5.35	5.55	7.65
Los Angeles (country)	5.60	7.60[8]	7.30[8]	7.25	8.65	5.90	8.55	5.35	7.20[1]	9.20[10]	5.20	5.40	7.50
San Francisco	5.20[21]	6.65[8]	....	6.85[8]	7.75[8]	5.75[21]	8.70[18]	5.05[21]	7.00[12]	9.35	5.20[21]	5.30[21]	7.10[20]
Seattle, Tacoma, Wash.	5.30[17]§§	....	7.10[8]‡	6.95	....	5.60[17]	....	5.45[17]	7.45[19]	8.50[12]	5.25[17]	5.55[17]	7.65[17]
Portland, Oreg.	5.30[17]§§	....	7.10[8]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[19]	....	5.25[19]	5.45[17]	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [13]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [23]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ add 15c for 100 lb for slow moving items; §§18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $47, Palmerton, Pa., $51, Pittsburgh. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $157, ton lot $172, less ton $189; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23.25c, ton lot 24.35c, less ton 25.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17.25c, ton lot 18.35c, less ton 19.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.8c per lb of alloy, carload packed, 8.55c, ton lot 9.45c, less ton 10.45c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 18.6c per lb of contained Cr, c.l., packed 19.5c, ton lot 20.65c, less ton 22.05c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l., 8MxD, bulk 20.1c per lb of contained Cr, c.l., packed 21.0c, ton lot 22.35c, less ton 24.1c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 28.5c per lb of contained Cr, 0.04% C 27.5c, 0.05% C 27.0c, 0.06% C 26.5c, 0.10 % C 26.0c, 0.15% C 25.5c, 0.20% C 25.25c, 0.50% C 25.0c, 1% C 24.5c, 2% C 24.25c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 25c per lb of contained chromium, carload, packed 26.1c, ton lot 27.3c, less ton 29.1c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, packed, max. 0.50% C grade, 93c per lb of contained chromium, ton lot 94.5c, less ton 97c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 9.3c per lb of contained Si, carload packed 10.9c, ton lot 12.35c, less ton 14.0c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.). Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.8c per lb of contained Si, carload packed 13.1c, ton lot 14.25c, less ton 15.5c; Central, add 0.3c for c.l. add 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 13.3c per lb of contained Si, carload packed 14.55c, ton lot 15.55c, less ton 16.7c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 15c per lb of contained Si, carload packed 16.2c, ton lot 17.15c, less ton 18.2c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low - Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe). Eastern Zone, c.l., lump, bulk, regular, 17.3c per lb of Si, c.l. packed 18.5c, ton lot 19.4c, less ton 20.4c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade, analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract basis fob Niagara Falls, N. Y., lump per lb c.l. 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 12.5c per lb of briquet, carload packed 13.2c, ton lot 14.0c, less ton 14.9c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8.7c per lb of briquet, c.l. packaged 9.5c, ton lot 10.3c, less ton 11.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3⅛ lb and containing exactly 2 lb of Mn and approx. ⅛ lb of Si). Eastern Zone, contract, c.l., bulk 8.75c per lb of briquet, c.l. packed 9.55c, ton lot 10.35c, less ton 11.25c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 5.1c per lb of briquet, c.l. packed 5.25c, ton lot 6.7c, less ton 7.6c. **(Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 5.25c, c.l. packed 6.05c, ton lot 6.85c, less ton 7.75c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 17.50c per lb of alloy, carload packed 19.0c, ton lot 19.8c, less ton 20.8c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 16.25c per lb of alloy, carload packed 16.45c, ton lot 19.35c, less ton 20.85c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.75c, ton lot 7.5c, less ton 8.35c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%. C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.4c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone, contract, 100 lb or more. 1" x D, $1.20 per lb of alloy, freight allowed. Less than 100 lb $1.30; Central, add 0.75c; Western, add 2.9c, freight allowed. Spot add 5c.

Borosil: (3 to 4% B, 40 to 45% Si). $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.

CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, carload packed 17.25c per lb of material, ton lot 18.00c, less ton 19.25c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 39c per lb of alloy, ton lot 41c, less ton 43c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 15.0c per lb of alloy, ton lot 15.75c, less ton 17.0c; Central add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 10c, ton lots 10.25c, smaller lots 10.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus: 17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

1947 Production of Minerals Sets Record

Value of total output rises 40 per cent to $12,400 million, Bureau of Mines reports

NEW YORK — Total value of minerals and mineral products produced in the United States and Alaska in 1947 reached a new all-time peak of $12,400 million, exceeding by 40 per cent the former record of $8859 million, established in 1946, according to the Bureau of Mines. On a tonnage basis, the volume of production is estimated 5 per cent greater than the previous peak output recorded in 1944, and about 13 per cent over the 1946 production.

Production of copper, lead and zinc in 1947 was considerably below previous peaks and substantially below domestic requirements so that large imports were required, the Bureau said. However, of the three major classes of mineral products, the greatest gain in 1947 (65 per cent) was made by metals, partly as a result of its labor and supply difficulties in 1946. Total value of metallic production in 1947 was $3 billion compared with $1823 million in 1946. The greatest percentage gains among the metals quantitatively in 1947 were for copper, aluminum, gold, silver and vanadium. Iron and molybdenum increased more than one-quarter; zinc and lead, about one-seventh. The principal metals whose outputs declined were manganese, chromium, tungsten and mercury.

COPPER — Copper smelted from domestic ores in 1947 was about 860,000 short tons, a 43 per cent gain over that of strike-harassed 1946. Yet the expansion attending the recovery was far from sufficient to fill large postwar needs for the metal. As the average annual price of copper increased nearly 50 per cent (30 per cent if bonus payments are considered) in 1947, the value of output climbed 107 per cent.

The domestic market was quiet with prices unchanged last week.

ZINC—Although the end of the Premium Price Plan in June, 1947, forced a number of zinc mines to close, only in the central states was the impact sufficient to precipitate a regional drop in production. Smelter output of zinc from domestic ores (estimated at 516,000 short tons) increased 12 per cent in quantity and 38 per cent in value, the Bureau reported.

Ernest V. Gent, secretary, American Zinc Institute, New York, recently reported that production of slab zinc in 1947 was the highest since 1944, an 11.6 per cent increase over 1946 and a peacetime record. All of the readily available capacity was not employed because of labor and housing shortages. Strikes and shutdowns due to power difficulties were responsible for some loss of production, but this was not as serious in terms of tonnage as in 1946.

Illinois Zinc Co., Chicago, increased the price of rolled zinc sheets and strips $1.50 per 100 pounds, effective as of Jan. 26, to conform to a similar increase in the price of slab zinc.

The primary zinc market was quiet with all business having been transacted since Jan. 20 at 12.00c, St. Louis.

LEAD — Despite the unremitting demand for lead in 1947, the Bureau of Mines reported, mine production was below the 1939-1945 level. The resultant shortage helped to boost prices so that a 16 per cent increase in smelter output from domestic ores (estimated at 340,000 tons) meant a 101 per cent gain in value in 1947 over 1946.

ALUMINUM — Aluminum production is estimated by the Bureau to have totaled 570,000 tons of primary metal in 1947, a 39 per cent increase above 1946 operations. Strengthened demand in the latter part of the year could not be matched by augmented production because of power shortages. The 12 per cent gain in domestic mined bauxite was insufficient to meet demand and necessitated the highest rate of import in history.

TIN — Ceiling price of Straits and English refined tin in Canada advanced 16 cents a pound to 96.00c, delivered Montreal or Toronto, effective as of Jan. 28. Straits tin here held unchanged at 94.00c.

NONFERROUS METAL PRICES

Copper: Electrolytic, carloads 21.50c, delivered Conn.; Lake, 21.62½c del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c 1000-4999 lb; 1½c, 500-999 lb; 2c 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 19.50-20.50c; 88-10-2 (No. 215) 29.00c; 80-10-10 (No. 305) 25.50; No. 1 yellow (No. 405) 15.50-17.00c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 12.00c, brass special 12.25c, intermediate 12.50c, E. St. Louis; high grade 13.00c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 16.00-16.50c; No. 12 foundry alloy (No. 2 grade) 16.00-16.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 16.00-16.75c; grade 2 (92-95%) 15.50-16.50c; grade 3 (90-92%) 15.25-16.25c; grade 4 (85-90%) 15.00-15.50c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c, fob Freeport, Tex.; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 to 4000 lb, 35.00-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (including Straits), 94.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 93.85c; Grade C, 99.65-99.79% incl. 93.50c; 99.00-99.64% 93.50c and 98.00-98.99%, 92.60c for tin content.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 224-999 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 33.75c lb; 25 lb pigs produced from electrolytic cathodes 35.25c lb; shot produced from electrolytic cathodes 36.25c lb; "F" nickel shots or ingots for addition to cast iron 34.25c lb. Prices include import duty.

Mercury: Open market, spot, New York, $77-$79 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, 20.50c per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg) $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y., 74.62½c, per ounce.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

Copper and brass product prices are fob mill, with freight prepaid on 200 lb or more.

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., hot-rolled, 38.44c; nickel silver, 18%, 42.29c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

Copper Wire: Bare, soft, fob eastern mills, carlots 26.92c, less carlots 27.42c; weatherproof, fob eastern mills, carlots 27.60c, less carlots 28.10c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 17.00c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 16.00c, fob mill, 36,000 lb and over. Plates, not over 12-in., 15.00c; over 12-in., 16.00c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 5000 lb, 93.50c; less than 200 lb, 95.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb, 95.75c; less than 200 lb, 97.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., price on application.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.50c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.

To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)
Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A, B	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.25, No. 2 copper 17.25, light copper 16.25, composition red brass 15.00-15.25, auto radiators 12.00-12.25, heavy yellow brass 10.75-11.00, brass pipe 12.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.50, No. 2 copper 17.50, light copper, 16.50, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 15.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.50-17.00, No. 2 15.50-16.00, light copper 14.00-14.50, No. 1 composition red brass 12.25-12.75, No. 1 composition turnings 11.75-12.25, mixed brass turnings 7.75-8.25, new brass clippings 12.50-13.00, No. 1 brass rod turnings 10.00-10.50, light brass 6.25-6.75, heavy yellow brass 8.75-9.00, new brass rod ends 10.50-11.00, auto radiators, unsweated 9.75-10.25, cocks and faucets 10.00-10.25, brass pipe 9.50-9.75.

Lead: Heavy 12.00-12.50, battery plates 7.00-7.25, linotype and stereotype 14.50-15.00, electrotype 12.00-12.50, mixed babbitt 13.50-14.00, solder joints 16.50-17.00.

Zinc: Old zinc 5.50-5.75; new die cast scrap 4.75-5.25, old die cast scrap 2.75-3.25.

Tin: No. 1 pewter 60.00-62.00, block tin pipe 77.00-78.00, auto babbitt 45.00-47.00, No. 1 babbitt 45.00-48.00, siphon tops 45.00-47.00.

Aluminum: Clippings, 2S 9.00-9.50, old sheets 7.00-7.50, crankcases 7.00-7.50, borings and turnings 2.50-3.00, pistons, free of struts, 6.00-6.50.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Dec. Average..	21.50	14.825	10.50	85.704	15.00	33.00	35.00	74.625
Jan. 1-20	21.50	14.80–14.85	10.50	94.00	15.00	33.00	33.75	74.625
Jan. 21-29 ...	21.50	14.80–14.85	12.00	94.00	15.00	33.00	33.75	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.50
No. 2 Heavy Melt. Steel	40.50
No. 1 Busneling	40.50
Nos. 1, 2 and 3 Bundles	40.50
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings.	37.50-38.50
Cast Iron Borings	37.50-38.00
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.00
Heavy Turnings	40.50-41.00

Cast Iron Grades

No. 1 Cupola	58.00-59.00
Charging Box Cast	45.00-47.00
Heavy Breakable Cast.	46.00-47.00
Unstripped Motor Blocks	50.00-51.00
Malleable	69.00-70.00
Brake Shoe	50.50-51.00
Clean Auto Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.00-41.50
R.R. Malleable	69.00-70.00
Axles	51.50-52.00
Rails, Rerolling	54.50-55.00
Rails, Random Lengths	52.50-53.00
Rails, 3 ft and under	54.00-54.50
Rails, 18 in. and under	55.00-55.50
Railroad Specialties	55.00-56.00
Uncut Tires	52.00-52.50
Angles, Splice Bars	53.00-54.00

CLEVELAND

No. 1 Heavy Melt. Steel	$39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Busheling	39.50-40.00*
Nos. 1 & 2 Bundles	39.50-40.00*
Machine Shop Turnings	34.50-35.00
Mixed Borings, Turnings	34.00-36.00
Short Shovel Turnings.	35.50-36.00
Cast Iron Borings	35.50-36.00
Bar Crops and Plate	44.50-45.00
Punchings & Plate Scrap	44.50-45.00
Heavy Turnings	39.50-40.50
Alloy Free Turnings	37.50-38.50
Cut Structurals	52.50-54.50

* Plus applicable freight springboard.

Cast Iron Grades

No. 1 Cupola	65.00-67.00
Charging Box Cast	60.00-62.00
Stove Plate	60.00-62.00
Heavy Breakable Cast.	58.00-60.00
Unstripped Motor Blocks	58.00-59.00
Malleable	70.00-75.00
Brake Shoes	54.00-55.00
Clean Auto Cast	65.00-67.00
No. 1 Wheels	60.00-61.00
Burnt Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*
R.R. Malleable	70.00-75.00
Rails, Rerolling	60.00
Rails, Random Lengths	59.00-60.00
Rails, 3 ft and under	63.00-65.00
Cast Steel	58.00-60.00
Railroad Specialties	53.00-55.00
Uncut Tires	56.00-57.00
Angles, Splice Bars	61.00-62.00

* Earmarked material; open market price $48.50-$49.50.

VALLEY

No. 1 Heavy Melt. Steel	40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Bundles	40.00-40.50*
Machine Shop Turnings	34.50-35.50
Short Shovel Turnings.	36.50-37.00
Cast Iron Borings	36.00-36.50
Low Phos.	48.50-49.50

* Plus applicable freight springboard.

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*

* Earmarked for return to steel supplier. Price in open market, $48.50-$49.50.

MANSFIELD

Machine Shop Turnings	37.00-38.00
Short Shovel Turnings.	37.00-38.00

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
No. 1 Bundles	39.50
No. 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings.	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	55.00
Charging Box Cast	43.00
Heavy Breakable Cast.	50.00
Stove Plate	47.00
Unstripped Motor Blocks	45.00
Brake Shoes	45.00
Clean Auto Cast	55.00
Drop Broken Cast	60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00
R.R. Malleable	68.00
Rails, Rerolling	58.00
Rails, Random Lengths	56.00
Rails, 18 in. and under	60.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-35.50
No. 1 Busheling	35.00-35.50
Nos. 1 & 2 Bundles	35.00-35.50
No. 3 Bundles	35.00-35.50
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings.	30.00-30.50
Cast Iron Borings	30.00-30.50
Punchings & Plate Scrap	41.00-41.50

Cast Iron Grades

No. 1 Cupola Cast	60.00-62.00
Heavy Breakable Cast.	50.00-52.00
Clean Auto Cast	62.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$42.50-44.50
No. 2 Heavy Melt. Steel	39.75-41.00
No. 1 Busheling	39.75-41.00
No. 1 & 2 Bundles	39.75-41.00
Machine Shop Turnings	35.00-36.00
Mixed Borings, Turnings	35.00-36.00
Cast Iron Borings	35.00-36.00
Short Shovel Turnings.	36.00-36.50
Low Phos.	47.00-48.00
Elec. Furnace Bundles.	44.00-45.00

Cast Iron Grades

No. 1 Cupola	58.00-60.00
Mixed Cupola	54.00-56.00
Heavy Breakable Cast.	51.00-52.00
Malleable	70.00-75.00
No. 1 Wheels	52.00-54.00
Clean Auto Cast	58.00-60.00

Railroad Scrap

Rails, 3 ft. and under.	51.00-53.00
Railroad Specialties	50.00-51.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$43.00-44.00*
No. 2 Heavy Melt. Steel	40.50-41.50*
No. 1 Busheling	40.50-41.50*
No. 1, No. 2 Bundles	40.50-41.50*
No. 3 Bundles	38.50-39.50*
Machine Shop Turnings	35.00-36.00
Mixed Borings, Turnings	34.50-35.50
Short Shovel Turnings.	36.00-37.00
Bar Crop and Plate	47.50-48.50
Punchings & Plate Scrap	47.50-48.50
Cut Structurals	47.50-48.50
Elec. Furnace Bundles.	44.50-45.50
Heavy Turnings	43.00-44.00
No. 1 Chemical Borings	42.00-43.00

Cast Iron Grades

No. 1 Cupola Cast	60.00
No. 1 Machinery Cast.	61.00-62.00
Charging Box Cast	57.00
Heavy Breakable Cast.	57.00
Unstripped Motor Blocks	52.00-53.00
Malleable	74.00-76.00
Clean Auto Cast	60.00
No. 1 Wheels	64.00-65.00

* Nominal.

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.03*
No. 2 Heavy Melt. Steel	34.03*
No. 1 Busheling	34.03*
Nos. 1 & 2 Bundles	34.03*
No. 3 Bundles	32.03*
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	29.00-30.00
Short Shovel Turnings.	31.00-32.00
Punchings & Plate Scrap	40.00
Cut Structurals	40.00
Elec. Furnace Bundles.	40.00

* Nominal.

Cast Iron Grades

No. 1 Cupola Cast	51.00-52.00
Charging Box Cast	51.00-52.00
Heavy Breakable	50.00-51.00
Unstripped Motor Blocks	47.50-48.50
Malleable	60.00-62.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.50-32.50
No. 2 Heavy Melt. Steel	31.50-32.50
No. 1 Bundles	31.50-32.50
No. 1 Busheling	31.50-32.50
Machine Shop Turnings	27.00-28.00
Mixed Borings, Turnings	28.00-29.00
Short Shovel Turnings.	28.50-29.50
Bar Crops and Plate	33.00-34.00
Punchings & Plate Scrap	33.00-34.00
Chemical Borings	30.00-31.00

Cast Iron Grades

No. 1 Cupola Cast	54.00-56.00
Charging Box Cast	40.00-41.00
Heavy Breakable Cast.	50.00-52.00
Stove Plate	46.00-47.00
Unstripped Motor Blocks	45.00-46.00
Clean Auto Cast	44.00-45.00

CHICAGO

No. 1 Heavy Melt. Steel	$39.00-39.50
No. 2 Heavy Melt. Steel	39.00-39.50
Nos. 1 & 2 Bundles	39.00-39.50
No. 3 Bundles	37.00-37.50
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Short Shovel Turnings.	36.00-36.50
Cast Iron Borings	35.00-35.50
Bar Crops and Plate	45.00-45.50
Punchings	50.00-50.50
Elec. Furnace Bundles.	40.00-40.50
Heavy Turnings	38.50-39.00
Cut Structurals	44.00-44.50

Cast Iron Grades

No. 1 Cupola Cast	62.00-65.00
Clean Auto Cast	62.00-65.00
No. 1 Wheels	53.00-56.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	48.00-48.50
Malleable	72.00-74.00
Rails, Rerolling	59.00-61.00
Rails, Random Lengths	55.00-56.00
Rails, 3 ft and under	62.00-63.00
Rails, 18 in. and under	64.00-65.00
Railroad Specialties	57.00-58.00
Angles, Splice Bars	61.00-62.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$39.50-40.50
No. 2 Heavy Melt. Steel	37.50-38.50
Machine Shop Turnings	31.00-33.00
Short Shovel Turnings.	31.00-33.00

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	55.00-60.00
Mixed Cast	54.00-56.00
Heavy Breakable Cast.	45.00-50.00
Brake Shoes	46.00-47.00
Clean Auto Cast	56.00-61.00
Burnt Cast	47.00-49.00

Railroad Scrap

R.R. Malleable	65.00-70.00
Rails, Rerolling	58.00-61.00
Rails, Random Lengths	53.00-55.00
Rails, 3 ft and under	57.00-60.00
Uncut Tires	46.00-47.00
Angles, Splice Bars	48.00-49.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	51.00
Stove Plate	43.00
No. 1 Wheels	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	45.00
Axles, Steel	39.00
Rails, Rerolling	52.00
Rails, Random Length.	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	24.00
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	22.00
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	24.50
Cut Structurals	24.50

Cast Iron Grades

No. 1 Cupola Cast	30.00
Charging Box Cast	25.00
Heavy Breakable Cast.	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melting	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	42.00-43.00
No. 2 Cast	35.00-37.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

Sheets, Strip . . .

Granite City Steel Co. advances electrical and culvert sheet prices $7

Sheet Prices, Page 160

St. Louis—Granite City Steel Co. last week raised the price of electrical and culvert sheets $7 a ton. Culvert sheets, No. 16 flat, are now quoted at that basing point as follows: copper alloy, 5.00c and copper-iron or pure iron, 5.35c per pound. Electrical sheets, No. 24, armature, 5.25c are quoted as follows: Armature, 5.25c; electrical, 5.75c; motor, 6.50c; and dynamo, 7.20c.

Pressure for flat-rolled steel in this district has reached an unprecedented high, with demand on the constant upgrade and production diminishing slightly. The squeeze is created by two unusual internal factors: Reduction of the market supply of strip to feed pipe mills and a curtailment of hot-rolled sheets pending completion of a new cold reduction mill. The overall bottleneck is ingot production, since this district now contains considerably more rolling than furnace capacity.

Currently, scrap scarcities have shut down one furnace, while during the past 12 months strikes have frequently curtailed finishing operations. One result is that flat steel consumers able to do so are reported shifing to use of aluminum sheets and strips. Considerable copper pipe also is going into home construction due to lack of skelp for pipe.

Galvanized sheets are equally critical, this area having cut off that item during the war for plates, thus stacking up a heavy demand backlog. Even now, galvanized output is limited almost entirely to roofing. And in February operation of a new rod mill is scheduled to cut further the supply of strip available to fabricators.

For the most part, second quarter books are not yet open since mills are wary of loading up while national steel allocations proposals are in the air. That and the scrap situation are the two leading uncertainties for the second quarter which may lead to greater disparity between supply and demand.

New York — New York delivered prices on cold-rolled sheets have been advanced to 4.042c, as compared with 4.001c previously. This reflects the increase in the New York intrastate rates from Buffalo, the governing base, and is in line with the interstate rates which went into effect Jan. 5. The effective date for the intrastate rates was shifted from Feb. 1 to Jan. 17.

Early action is expected in the case of at least one or two producers in the establishment of consumer quotas for second quarter and, in fact, one large mill, which has just shifted to a monthly basis, has set up quotas for April. Second quarter action may be somewhat tentative, however, pending development of the voluntary priority system which the industry is now working out with Washington officials.

No easing in supply is noted in any major grades with consumers unable to obtain anywhere near their requirements from their regular sources. Some are relying on the gray market for help in special emergencies, but are discouraged from buying any more than is absoutely necessary by the high premiums demanded. Stainless steel sheets and a few specialties are the only hot-rolled products which appear in sufficient supply to balance demand.

Philadelphia — One large sheet producer has set up quotas for April, switching from a quarterly to a monthly basis for establishing consumer allocations. Conditions are too uncertain to establish quotas for the more extended period, and a better control, it is believed, will thus be assured. Some customers of this seller understand that unless there is some unforeseen change in conditions they will receive about the same amount in the two succeeding months, but admit no definite assurances to that effect.

Pittsburgh — In contrast to other steel products, output of sheets and strip have not yet been adversely affected by the acute shortage of gas for industrial uses. However, some finishing mills may be forced down soon should present near zero weather persist.

Some improvement in silicon sheet supply is indicated this summer, with at least one producer planning to augment production through utilization of

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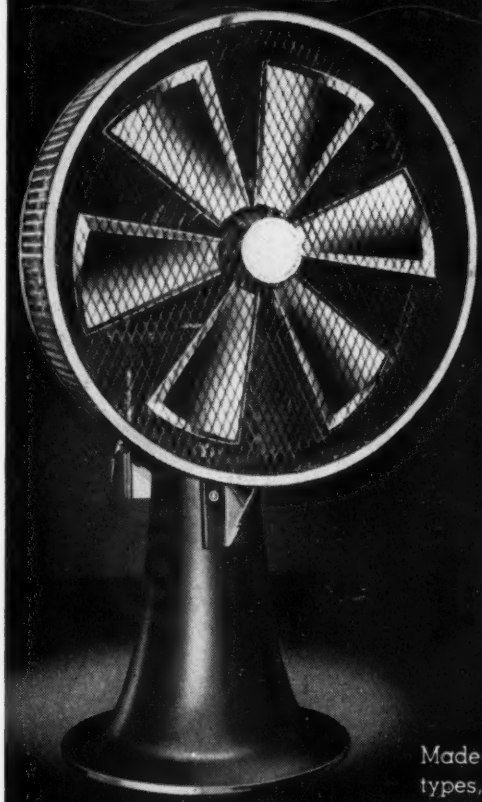

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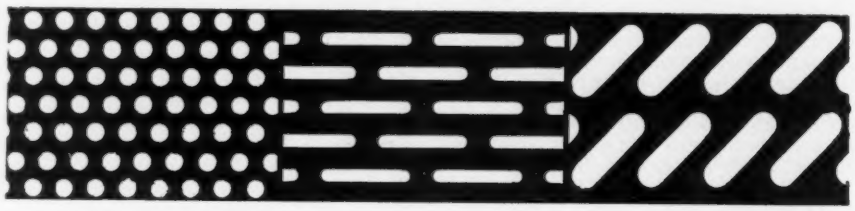

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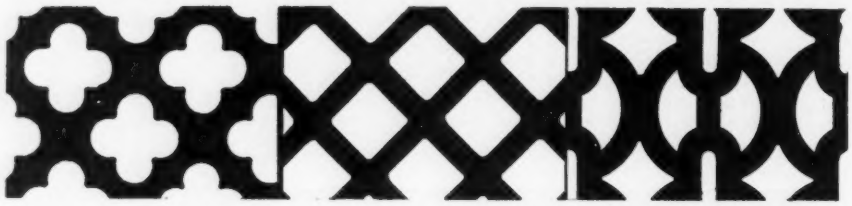

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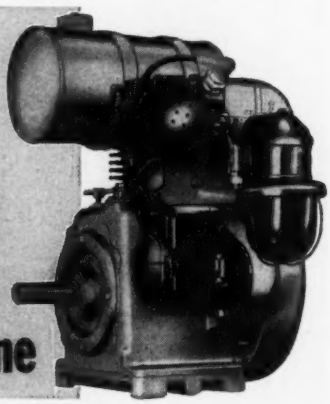

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a 54-inch cold-reduction mill for this purpose. Some consumers contend that hot-rolled steel supply is "drying up" due to increased percentage of this material going into cold-reducing mills.

Unbalanced demand-supply situation is expected to become more pronounced for some consumers over coming months, due primarily to probable adjustments in mill allotments to meet augmented export requirements and "preferred" domestic needs. This situation is expected to force an additional number of consumers to seek supplementary steel supply sources.

Cleveland — Coating extras on galvanized sheets produced by Republic Steel Corp. have been raised 60 cents to $2 a ton, effective as of Jan. 21, as a result of the recent increase of 1-1/2 cents a pound on zinc. Specifically, the increase per hundredweight on flat sheets is as follows: 9 to 14 gage, inclusive, 3 cents; 15 to 23 gage, inc., 5 cents; 24 to 27 gage, inc., 8 cents; and 28 to 32 gage, inc., 10 cents. Increases on galvanized roofing are per square: 16 gage, 14 cents; 18-20 gage, 10 cents; 22 gage, 9 cents; and 24-29 gage, 7 cents.

Small consumers, unable to have large sums of money tied up in unbalanced inventories of materials and components, are making strong pleas for deliveries of carbon sheets and strip to put inventories in balance and thereby make it possible to work off inventories to the lowest possible safe level. However, one large consumer, which it was understood had been unable to obtain sufficient supplies of steel, is reported now to be specifying on its orders for flat-rolled products that shipments are not to be made prior to requested shipping date.

Buffalo—Reports of gray market activities in steel sheets, which usually tie-in with a scrap commitment, have been heard frequently. Leading mills are endeavoring to lick the movement by demanding the scrap from factories and plants which they supply with finished steel products. While gray market deals are generally on the secretive side, scrap sources report numerous and diversified approaches from steel consumers who are willing to pay exorbitant prices for scrap.

Cincinnati — Sheet production in this district was adversely affected last week by a cold wave which cut supplies of gas for annealing operations and other purposes. American Rolling Mill Co. reported the gas supply at Butler, Pa., was also short. Mills sought to sustain the steelmaking rate even though it was at the expense, by fuel conservation, of some other divisions.

Tubular Goods . . .

Tubular Goods Prices, Page 161

New York — Cast iron pipe prices have advanced $5 a ton to the following levels for class B, 6-inch and over: $79.50 per net ton, Birmingham: $84.50, Burlington, N. J. Four-inch pipe is quoted $5 higher, while class A pipe is quoted $5 a ton above class B base prices.

Seattle — Cast iron pipe agencies report seasonal apathy, although renewed interest is expected shortly. Long deferred deliveries continue a serious handicap in bidding against other types of water mains.

Steel Bars . . .

Bar Prices, Page 160

New York—With new New York intrastate rates now in effect, although originally set for Feb. 1, hot rolled carbon bar delivered prices here are 3.392c, compared with 3.351c, previously. This reflects an increase in the rate from Buffalo, the governing base, as of Jan. 17.

Supply, meanwhile, continues tight with little or no new tonnage available, even in the larger sizes, for shipment in the current quarter and with producers generally as yet not having opened their books for beyond the current quarter.

While some producers of the small sizes of cold-drawn bars, flats in particular, are booked up well into late second quarter, consumers can still obtain some sizes for shipment before the end of this quarter and on certain of the small specifications can pick up tonnage for delivery early in May.

Pittsburgh—A number of producers are no longer meeting the Detroit and eastern Michigan arbitrary delivered prices on hot-rolled alloy and cold-finished alloy bars. Great Lakes Steel Corp. reportedly is producing only a relatively small tonnage of alloy spring flats and rounds for automotive coil springs, while Rotary Electric Steel Co. is no longer producing alloy bars. This fact, plus exhorbitant freight absorption into those districts, has prompted producers here to base their product prices on the nearest governing basing points, which would be Massillion, Canton, O., or Chicago, depending on the product and destination. Up to late last week, Republic Steel Corp., Carnegie-Illinois Steel Corp., American Steel & Wire Co. and Inland Steel Co. had established this new pricing policy. Similar action among nonintegrated cold finishers was taken by Columbia Steel & Shafting Co., with the probability that others would follow.

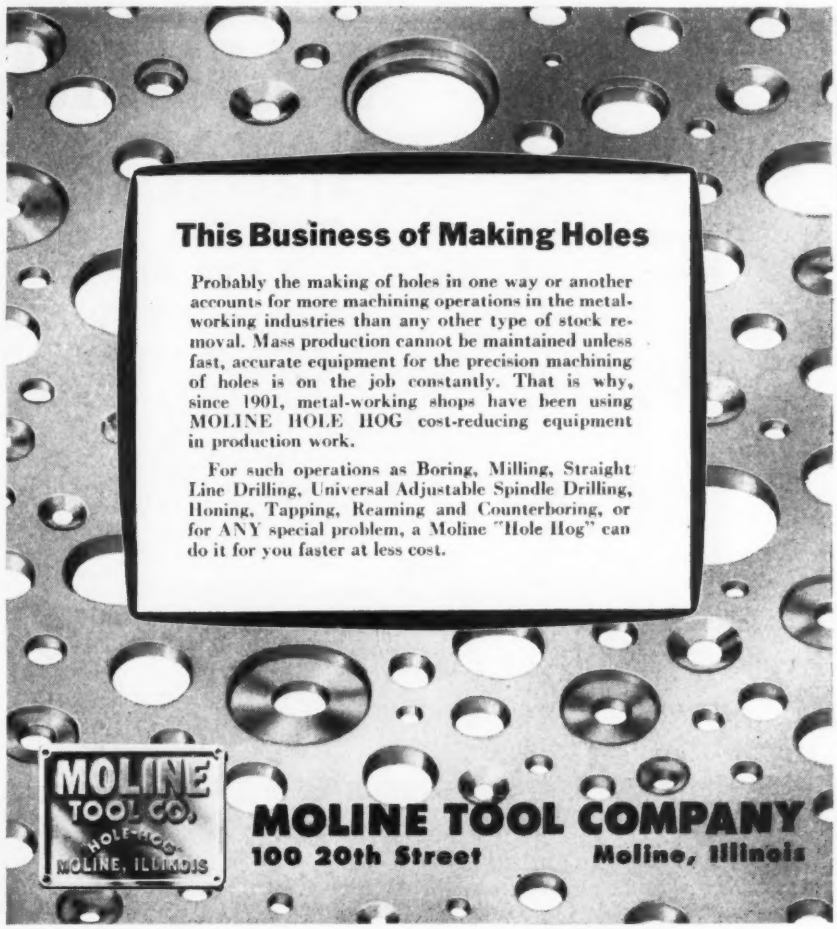
Wire . . .

Wire Prices, Page 161

Pittsburgh—Wire sellers note little change in demand pattern over the last few weeks, with most consumer groups seeking substantially more tonnage than is being shipped under monthly mill allotments. In fact, the gas shortage has disrupted annealing and other mill operations here to the extent that shipments this month will fall considerably short of these quotas. Some interests report a number of new prospective customers seeking a position on rolling schedules for farm fence and bale ties. This is attributed in part to the fact that Portsmouth Steel Corp. has ceased temporarily production of these items.

One producer has raised bright basic wire to $4 per 100 pounds. Pittsburgh Steel Co. recently increased wire rods $10 a ton to $3.55 per 100 pound base.

Birmingham—A slight falling off early in January in demand for wire products has disappeared. Jobbers are being importuned by retail outlet sources for most items in wire, and manufacturers continue their pressure for deliveries. Neither, however, find outlook encouraging.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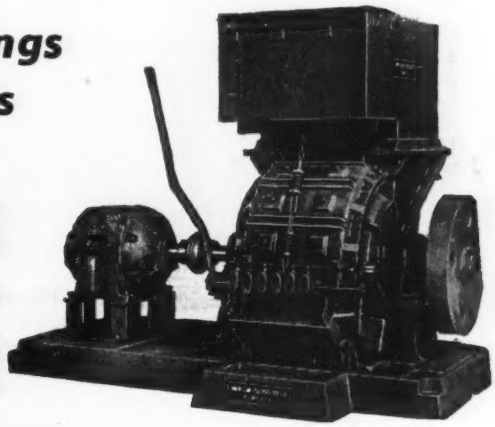

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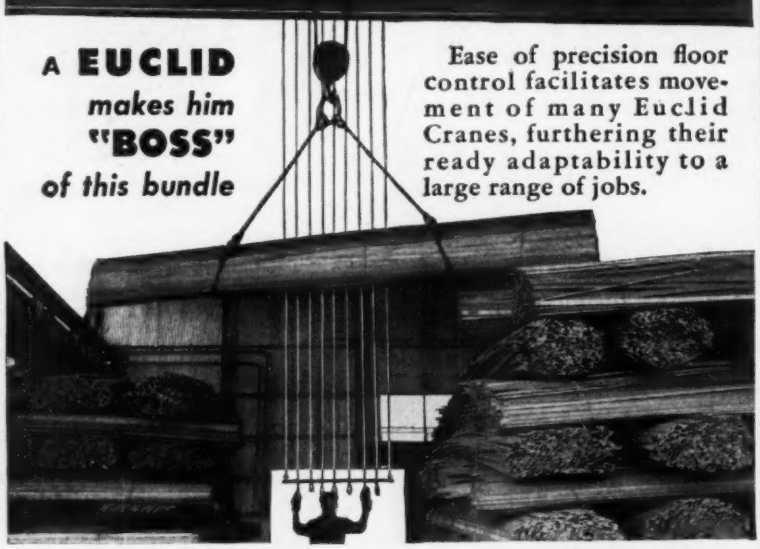

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Structural Shapes . . .

Structural Shape Prices, Page 161

New York — Structural shipments in 1947, according to the American Institute of Steel Construction Inc., amounted to 1,915,144 tons, an increase of 23.4 per cent over the 1,551,607 tons shipped in 1946, and 30.7 per cent over the shipments in the average prewar years, 1936-1940. Bookings of 1,628,756 tons did not quite equal the 1946 total, but were 8 per cent over the 1,509,496 tons reported in the prewar years. Tonnage available for fabrication Dec. 31 was 671,091 tons, against 646,090 tons at the end of the previous year.

December shipments amounted to 172,968 tons compared with revised totals of 175,000 and 169,139 tons in November and October, respectively. December bookings amounted to 144,103 tons, compared with the revised totals of 132,916 and 159,132 for November and October, respectively.

Philadelphia — Structural demand is being sustained, with orders somewhat spotty, but considerable work is still being figured in the aggregate. Private, as well as public work, is being noted, with most fabricators selective in their figuring, as backlogs are well extended. Pending formulation of the voluntary allocation program, hot carbon bar consumers are uncertain as to the outlook for tonnage, and indications are it may require some time for final clarification. As a matter of fact, producers themselves fear a somewhat drawn-out procedure and are planning to set up second quarter consumer quotas without much delay, even though revisions likely will have to be made later.

Pittsburgh — Fabricators report a moderate decline in structural steel inquiries due to normal seasonal influences. However, most interests are well behind on previous commitments due to continued acute shortage of plates and structural items, with result no easing in fabrication activity is indicated for some time.

Universal-Cyclops Steel Corp. has awarded a contract for about 340 tons to Pittsburgh Bridge & Iron Co., Pittsburgh, for erection of three large steel buildings as additions to company's Titusville, Pa., plant.

Birmingham — Construction men report inquiries at least in the tentative stage for quite a tonnage of shapes. But some of them fear that many of them may go the way of other projects when final construction costs are computed.

Seattle — Business is reported slow by fabricating plants but this is a normal seasonal symptom.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 160

Seattle — Less private construction is coming out at all Pacific Coast centers, due in large measure to high costs. However, there seems to be little or no decline in the volume of public works where costs seem to have less weight. Reinforcing bar mills in this area report backlogs are about static as new business is equal to production. Plants are operating at peak capacity and are not soliciting new jobs, making special efforts to clean up back orders. Several sizable contracts are pending. Jobs involving small tonnages are numerous.

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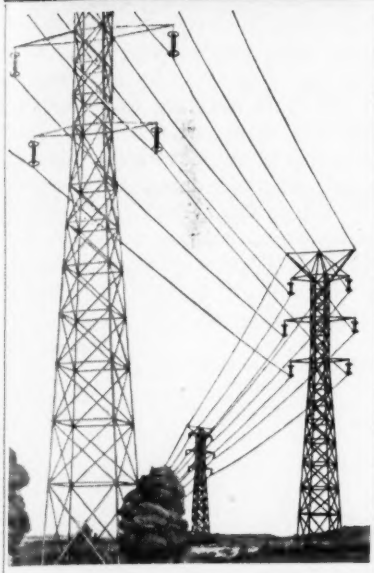

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hot-dip GALVANIZING

Plates . . .

Plate Prices, Page 161

Philadelphia — District plate production continues to be handicapped by scarcity of scrap and pig iron, with shipments from the outside off somewhat as a particular reflection of gas shortage at some plants. As a matter of fact, gas shortages in various sections of the country due to severely cold weather are causing some producers to hold up calculations on second quarter consumer quotas until it can be ascertained more closely what production losses might result from these shortages.

Coatesville, Pa. — Lukens Steel Co., this city, has increased the base price for carbon steel plates and alloy steel plates $6 per net ton, effective as of Jan. 26. Base price for Lukens carbon steel plates is now $3.45 per 100 pounds; for alloy plates, $4.80.

"Lukens has refrained from raising the price of steel plates in the hope that such action would be unnecessary," J. Frederic Wiese, vice president in charge of sales, declared. However, he pointed out that "very substantial increases in the cost of scrap metal, pig iron and other raw materials used in the manufacture of steel plates have brought an increase in our steelmaking cost which can no longer be ignored."

Cleveland—A leading steel jobber here reported that Cleveland in no longer a basing point for free-machining plate, 3/16 in. to ¾ in., it handles. Basing points remaining on this specialty stocked by this jobber are Pittsburgh, Chicago and Sparrows Point, Md.

Birmingham—Pressure for plates remains strong. One large consumer has picked up a few tons as far away as Oregon, while others have bought here and there for months over the past several years. Structural shops are not getting sufficient plate tonnage, although car building is faring somewhat better of recent months.

Seattle — No large plate contracts are pending. Shops report fair backlogs of tank and boiler work but scarcity of material is limiting bidding to smaller jobs calling for tonnages not in excess of supplies available.

Warehouse . . .

Warehouse Prices, Page 163

Cincinnati—Buyers continue their search for warehouse steel despite recent curtailment of fabrication due to seasonal influences. January sales were at a high level, although jobbers are unable to narrow the gap between supply and demand in flat-rolled, structurals, and other scarce items. The price increase recently announced is in general effect.

Seattle — Wholesalers report a steady demand for all items, volume of business having shown no marked decline over the yearend. Plates, sheets and reinforcing bars continue extremely scarce and no immediate easing is in sight. Stainless steel is in fair supply. Due to recent freight increases, jobbers have advanced galvanized sheets 25 cents and plates 10 cents. Items produced by Coast mills are not affected. The increase in galvanized sheets is due also to larger zinc content. Wholesale stocks are low and badly broken.

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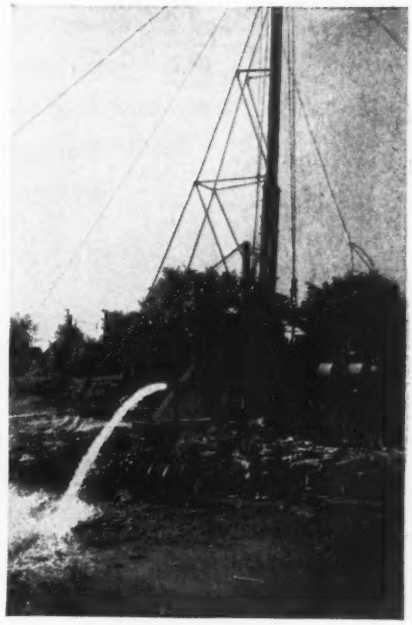

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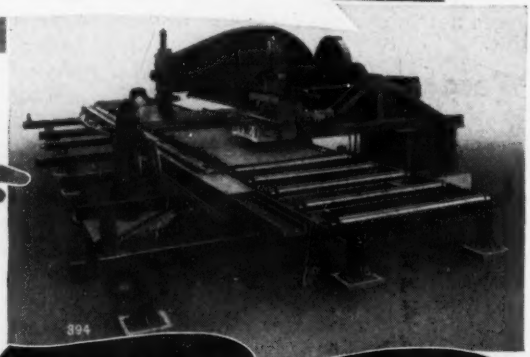

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U. S. Steel Export Co. Revises Price Schedule

New York—United States Steel Export Co., this city, has revised its export base prices, effective Feb. 1, as a result of changes in published freight rates covering iron and steel products for export. The new schedule, noted below, covers the principal carbon steel products, with freight included to New York, Philadelphia or Baltimore. All prices are net cash and subject to adjustment to sellers' prices in effect at time of shipment to the mill.

	Per Gross Ton
Billets, Blooms and Slabs	
Rerolling quality	$58.38
Forging quality	68.38
Wire Rods	75.63
	Per 100 Lb
Skelp	$3.28
Structural Shapes, standard	3.48
Plates, plain	3.73
Plates, floor	4.98
Bars, hot-rolled	3.73
Bars, concrete reinforcing	3.58
Bars, fabricated reinforcing	4.18
Bars, cold-finished	4.20
Piling, sheet steel	3.98
Hoops, tight cooperage	3.78
	Per Net Ton
Rails, standard, 61 lb & over	$70.57
Rails, light, 60 lb & under	74.92
Rails, girder	77.36
	Per 100 lb
Joint Bars for stand. rails	$4.95
Tieplates	4.95
	Per Base Box
Tin Plate, 107 basis weight	
Coke, 1.25 lb coating	$7.90
Coke, 1.50 lb coating	8.10
Electrolytic, Unassorted	
0.25 lb coating	7.10
0.50 lb coating	7.30
0.75 lb coating	7.50
Mfg. Ternes, 107 lb basis weight	
Unassorted	7.70
Special coated, unassorted	7.20
	Per 100 lb
Sheets	
Hot-rolled, 18 Ga. & heavier	$3.66
Hot-rolled, 19 Ga. & lighter	4.51
Cold-rolled, 15 Ga.	4.36
Galvanized, plain, 10 Ga.	4.63
Galvanized, corrugated, 10 Ga.	4.73
Strip	
Hot-rolled	3.48
Cold-rolled, 0.25 C & under	4.23
Wire	
Bright nail	4.23
Black annealed	4.88
Galvanized, plain	5.33
	Per 80-Rod Spool
Barbed Wire	
Lyman 4-pt., 5-in.	5.62
Glidden 2-pt., 4-in.	5.15
	Discount
American Standard Pipe T. & C.	
Buttweld, 2½-in. & 3-in.	
Black	51.2
Galvanized	36.7
Seamless, 3½-in. to 6-in.	
Black	46.2
Galvanized	31.2
English Gas Tubes, T. & C.	
Buttweld, 2½-in. & 3-in.	
Black	50.5
Galvanized	39.0

Rails, Cars . . .

Track Material Prices, Page 161

New York — New freight cars received by the nation's railroads during 1947 totaled 68,507, an increase of 26,552 over the 1946 total, according to the Association of American

Railroads. The carriers continued to retire old cars more rapidly than they got new ones, the retirements totaling 71,331 cars in 1947 against 61,004 in 1946. As of Jan. 1, the railroads had on order 119,786 freight cars and 1226 locomotives, of which 1192 were diesels.

Domestic freight car awards for 1947 involved 121,707 cars, as compared with 66,723 in the preceding year.

Awards in December, the final month of the year, amounted to 4,218 cars.

St. Louis — St. Louis-San Francisco Railway is ordering four new diesel-electric locomotives of 4500-horsepower each. Cost of the new locomotives will be about $1,734,720 and will bring to a total of 96 units ordered by this carrier during the past few months.

Pig Iron . . .

Pig Iron Prices, Page 162

Pittsburgh — Industrial gas shortage to date this year has not adversely affected foundry operations to extent recorded a year ago, for many interests have converted to oil. However, it is questionable how long adequate oil supplies will remain available. Critical pig iron shortage may be relieved somewhat should lack of fuel force curtailment in foundry operations during February. However, this situation would be only temporary, with no significant relief in the overall foundry iron supply outlook indicated for months. The 1200 tons Monessen, Pa., blast furnace, recently purchased by Pittsburgh Steel Co., is not expected to be ready for pouring iron until June or July.

Philadelphia — District pig iron consumers look for little improvement in average weekly receipts in February, with supply still well short of requirements and the situation only aggravated by increasing stringency in cast scrap, prices on which continue to soar. Meanwhile, there is concern as to the possible effects of the proposed voluntary steel allocation program on the distribution of pig iron.

Boston — Lack of pig iron is slowing output at more plants, with transportation delays adding to difficulties. Foundry iron supply has narrowed to Mystic output, which has been suffering from ore and other raw material deficiencies. Shipments from Buffalo and other outside furnaces have dwindled to a trickle. Foundries are melting a high ratio of scrap, while steelworks' production is suffering from the lack of raw materials, including iron.

Cleveland—Foundries in Ohio, Indiana and Michigan have been voicing concern over efforts of Tucker Corp., Chicago, to have the War Assets Administration declare it highest bidder for the government surplus blast furnace, known as Republic No. 5, at Cleveland, and operated by Republic Steel Corp.

With Tucker Corp. seeking sources of materials and supplies for automobile production, foundries depending on Republic Steel for iron would view an award of the huge furnace to Tucker as a severe blow to their supplies.

Republic Steel's pig iron price at Cleveland, geared to the price of No.

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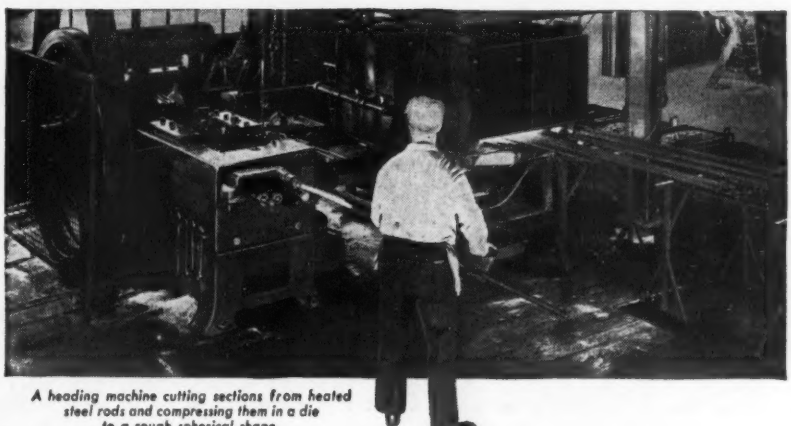

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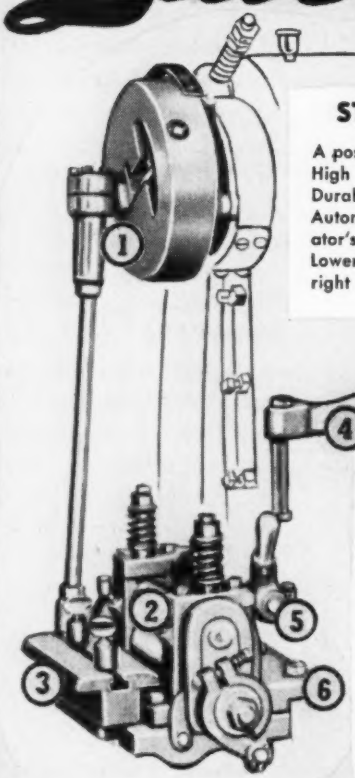

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1 heavy melting steel scrap, remained unchanged last week at $39.75 per ton for basic, inasmuch as there was no change in the scrap price. However, due to a rise in the scrap price at Buffalo where pig iron is on the same basis, Republic's quotations were up $1 a ton last week to $42.50 a ton for basic.

Buffalo—Endeavoring to alleviate the present acute pig iron situation, merchant iron producers are engaged in close figuring to spread February shipments to cover as many customers as possible. Virtually every foundry in the area faces another critical month, with no relief in sight at present. Efforts to substitute cast scrap for iron have met with little success except at exorbitant prices. One central New York melter paid more than $70 a ton for cupola cast. While operations hold at 94 per cent of capacity, there is still the threat of three or four furnaces being shut down at any moment.

Cincinnati — January output of castings in this district was below expectations, chiefly because of a tightening in pig iron supplies. This situation has been aggravated by severe weather which hampered deliveries of raw materials, curtailed gas supply, and employee absenteeism.

Birmingham — Foundry interests here do not like to give undue publicity to the fact, but they admit they expact no relief in the pig iron supply situation this half of the year; possibly not even in 1948.

Seattle — Foundries in this area are in a rather tight position as both pig and cast iron scrap are scarce. Some plants are finding it difficult to operate, although industry activity has declined in the last three months. Utah producers are said to be diverting their pig iron output to other areas so that receipts in the Northwest are far below demand. Increasing tonnages of scrap are being used but this material is also very tight. Pig is stationary at $39.50, base.

Scrap . . .

Scrap Prices, Page 166

Buffalo — With the Bethlehem Lackawanna plant shutting down three more furnaces, making a total of six, because of inadequate scrap supplies, leading mill consumers apparently proved to dealers that they would not budge in their stand against higher prices. As a result, the prolonged stalemate between dealers and mills was broken as new orders were placed for approximately 7000 tons of steelmaking grades at the mills' bid of $39.75 for No. 2 heavy melting and bundles. Turnings will be rejected on this scale. The price is in line with mills' pricing formula which places No. 2 material and bundles at $20.50 above the old OPA ceiling of $19.25 here. The deal also lowers the range on No. 2 and bundles from $1 to $1.25 compared with prices paid previously by nonintegrated consumers.

Smaller consumers are also the target for considerable pressure from big consumers through various channels of the industry. This is the result of sales of No. 1 heavy melting at prices as high as $45 a ton.

Dealers accepting the $39.75 orders

are a bit dubious over immediate prospects of coverage, which explains the restricted tonnage. The fact that the mills' bid has been recognized doesn't necessarily mean a much weaker market. The action is looked upon more as a leveling-off movement. Even dealers agree that it might make for a healthier market in the future if prices can be held in line. It was conceded generally that prices might go $10 to $20 higher if mills gave in. It was pointed out, too, that higher prices might attract 10 to 15 per cent more scrap, but that mills in the long run would be further ahead by taking their present receipts at the reduced price than pay the increased price on entire receipts.

Philadelphia — While subject to little test, No. 1 heavy melting steel price continued to ease last week, with the market nominally around $34 to $44, delivered, and with the possibility that important consumer buying might develop a lower price. Other leading open-hearth grades are down 50 cents a ton from previous levels to a range of $40.50 to $41.50 and No. 3 bundles to $38.50 to $39.50. Machine shop turnings are higher at $35 to $36, delivered; bar crops and plate, punchings and plate scrap, and cut structurals at $47.50 to $48.50; chemical borings at $42 to $43.

Cast scrap continues to advance, with No. 1 cupola at $60, delivered; machinery, $61 to $62; charging box cast and heavy breakable, $57; malleable, $74 to $76, with even higher prices reported; clean auto cast, $60; and No. 1 wheels, $64 to $65.

Pittsburgh — Movement of scrap to mills has held up exceptionally well, considering adverse weather conditions. However, influx of material continues well below current consumption rate at some plants, reflecting inability of mills to place large tonnage commitments for dealers' scrap at current prices. In an effort to help stabilize scrap prices, some producers have notified customers that the practice of converting ingots will no longer be continued in those instances that involve the purchase of scrap at prices above voluntary ceilings established by major producers. Conversion of ingots supplied by at least one major source already has been terminated under this policy.

Supply of cast grades is so limited that price fluctuations are considerably more sporadic than in other scrap items with separate price negotiations necessary on almost every sale. This situation has resulted in some sales at over $65 per ton, although bulk of the restricted tonnage available is sold at $7 to $8 below this figure. Higher prices developed for turnings last week, with a small lot sale at $39.50 reported for short shovelings.

New York — Scrap brokers here are still quoting $34.03 for the principal open-hearth grades and claim they are now getting an increasing amount of tonnage at this figure, which is in line with the OPA formula. Other steel prices also are unchanged, but cast grades continue to advance. Brokers are now offering $53 to $54, fob shipping point, for No. 1 cupola and charging box cast; $52 to $53 for heavy breakable; $49.50 to $50.50 for unstripped motor blocks, $62 to $64 for malleable.

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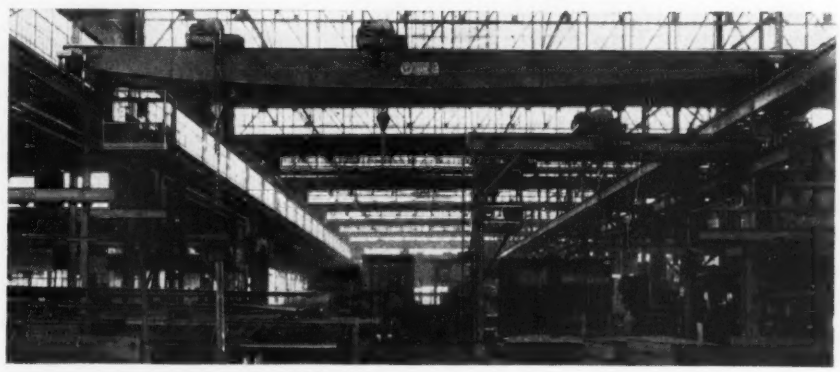

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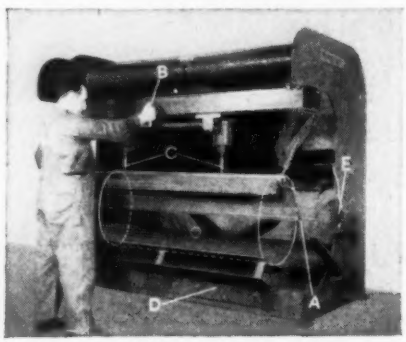

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slowed shipments of scrap here last week. However, the reduced movement produced no immediate effects on prices of steelmaking grades, although there was some thought it might force mills into the market with offers above the current price of $39.50 to $40.00 for No. 1 heavy melting earmarked for return from steel consumers to their mill sources of steel. On the other hand, it has been pointed out that the big mills have been able to hold the price line thus far through the winter and that if they can get through another month or six weeks they will be in a stronger position to continue resistance to price increases. However, continued shrinking of scrap supplies available for foundries is reflected in an increase of No. 1 cupola to $65 to $67.

Boston — While some No. 1 heavy melting steel has moved at $35, shipping point, larger consumers are not interested above $31.90 and practically no scrap is coming out at that price. Yard operations and shipments are hampered by weather conditions. Demand for cast grades is active and prices are stronger, as high as $60 for cupola cast reportedly being paid in southern New England.

Detroit — Cast scrap is perceptibly weaker as a result of good tonnage received on a few above-market transactions. Packard has received a flood of material from dealers after promising an extra new car for every ton accepted. These ex-allocation cars of course are not for immediate delivery, although some dealers thought they would be; rather they must be shipped in the normal course of production. One report is that the plant received two months' supply of cast scrap in two weeks' operation of the bonus plan. General Motors has launched a campaign among employees and dealers to convince them of the importance of increasing the flow of scrap through normal collection agencies to steel mills and foundries.

Cincinnati—The scrap price situation was unchanged last week. Mills were still holding to the formula price, some support for the plan coming from railroads who alloted steelmaking material on this basis. Frigid weather, hampering preparation and shipment of scrap, may soon bring a test although district melters, excepting foundries, appear fairly well stocked.

Chicago — Scrap situation here holds essentially unchanged pricewise, but with growing indications that railroad material, which has spiraled steadily, may be at its peak. Railroads are not getting the fantastically high prices quite as readily as recently. Steel mills will pay no more than $40.50, or $1 over regular heavy melting steel, for No. 1 railroad heavy melting, consequently only a small quantity is going to local steelmakers.

Birmingham—Movement of scrap is relatively light. Mills, especially the district's biggest user, are unable to get specific commitments at stated prices. The season's worst weather to date has materially interferred with preparation.

St. Louis—Slackening scrap shipments have dropped reserves to new lows, with prices rising correspondingly. Granite City Steel Co., the area's largest single consumer, shut down one of its 13 furnaces as stocks neared the danger point. Volume showed some pickup until Jan. 15 when weather cut it off. Country points report inability to obtain labor for gathering metal. Melters therefore are living off the scrap from mechanized yards and from industrial plants, whose output is better than usual. Foundries remain on a hand-to-mouth basis for scrap, paying whatever price is necessary to obtain it.

Seattle — No steel scrap is stored in rolling mill yards and stocks in nearby centers have been well depleted. Shipments are coming from greater distances and about equal present consumption. Consolidated Builders Inc., Portland shipbreakers, have purchased three large government vessels for scrap. Four more surplus ships, totaling about 25,000 tons of scrap, are up for sale to Puget Sound buyers. Fourteen steel frigates of the British Columbia fleet have been scrapped at Victoria plants.

Canada . . .

Toronto, Ont. — Canadian import ban on structural steel and machinery, originally planned to go into effect Feb. 1, has been postponed until Mar. 1, due to the government's inability to work out mechanics of control sooner. For new capital projects, however, the new U. S. dollar saving restrictions are in force. Thus, no company can risk starting a new project that will require materials from the United States without first obtaining a permit from government officials at Ottawa.

While iron and steel prices remain unchanged, Canadian prices on zinc and aluminum have been advanced. Prime western zinc advanced 1 cent to 11.75c per pound; high grade, 1.50 cents to 12.50; and special high grade, 1.25 cents to 12.75, delivered Toronto and Montreal. Aluminum advanced 1 cent to 15.00c per pound.

There has been little or no change in the iron and steel supply situation during the week. Inquiries continue in large volume, but new bookings by mills are somewhat restricted due to heavy commitments entered into earlier in the year. Insofar as most lines of steel are concerned, mills are solidly booked for first quarter and will have fairly large carryovers into the second quarter. Producers opened books last week for second quarter plate orders and filled them almost immediately. Consumers continue to take delivery on a monthly quota basis and will be allotted the same as for first quarter but possibly less in subsequent quarters.

Steel sheets, also under the quota system, have failed to show improvement in supplies with producers falling further behind in meeting demands. While imports of steel sheets from the United States have helped to take care of increased demands, the overall supply is not sufficient for the steadily growing demand.

While practically all sizes of carbon bars are in short supply and mills have no surplus capacity before the end of March, several sizes of cold-drawn bars are available both through producers and warehouses. No shortage is reported in alloy bars.

Structural steel shapes continue in fair supply but the future is doubtful. Postponement until Mar. 1 of the ban

on imports from the United States improves the immediate outlook, but this is taken as only a temporary relief. There will be a general tightening in supply for second quarter, especially with regard to imported shapes. Domestically produced shapes also are expected to show further tightness as demand on this source will be greatly increased.

No improvement has been reported in wire and nail supply despite increased production. Nails are decidedly scarce, especially in 2-1/2 and 3-inch sizes. Distributors have introduced a new sales angle for nails. Instead of asking what the customer requires, salesmen now place a number of slips in a hat with the various nail sizes and asks the prospective purchaser to pick a slip. The customer then gets one or two kegs of the size he picks, and in most cases his selection is far from the popular size.

Merchant pig iron demand is absorbing all available supply. Pig iron output is being maintained close to 75 per cent of capacity, but only about 40,000 tons monthly are being made available to merchant melters. Shortage of iron scrap has been reflected in a sharp increase in pig iron demand for foundry melting operations as compared with prewar conditions. Producers are feeding out iron in small lots and are not permitting large stockpiling by melters. No change is reported in pig iron prices.

Supply situation in iron and steel scrap is critical. Imports have tapered off, and there has been a general slowing down in receipts from domestic sources. Practically all consumers are depending on hand-to-mouth deliveries to take care of scrap requirements, and there are no indications of improvement until next spring, when some of the dormant supplies can be picked up from the rural districts. Some interests point out that the government ceiling on steel scrap is much too low to induce aggressive collection campaigns in farm communities where transportation costs are heavy.

Stampers See No Steel Supply Improvement

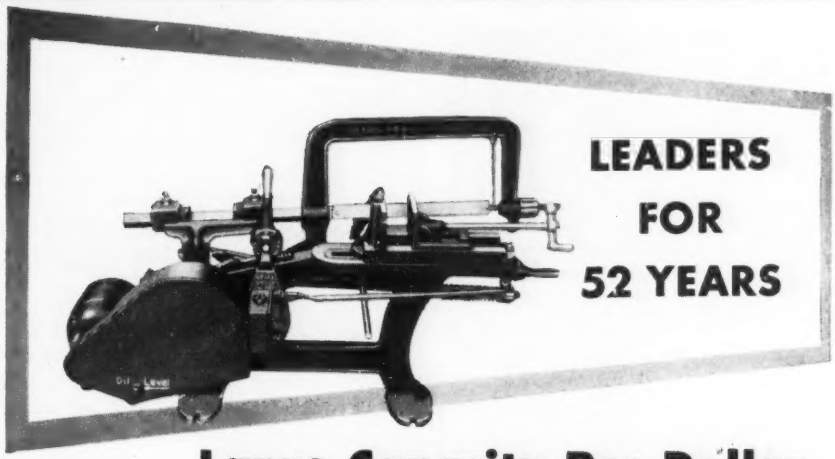
(Continued from Page 72)

1 per cent to 120 per cent above Jan. 1, 1947, and 68½ per cent reported an inventory below Jan. 1, 1947, ranging from 5 per cent to 90 per cent.

Sixty-seven per cent of the stampers stated that one to six steel producers with whom they had a "historical position" had stopped or had notified them they would stop shipping steel to them.

The question, "Have mills put any limitation on the size or type of order they will accept?" brought an affirmative answer in 74 per cent of the replies.

"What do you consider as of today your prospects for steel supplies in 1948; will they be adequate for your needs; will they be more than received in 1947?" was the final question. Ninety-three per cent stated de-



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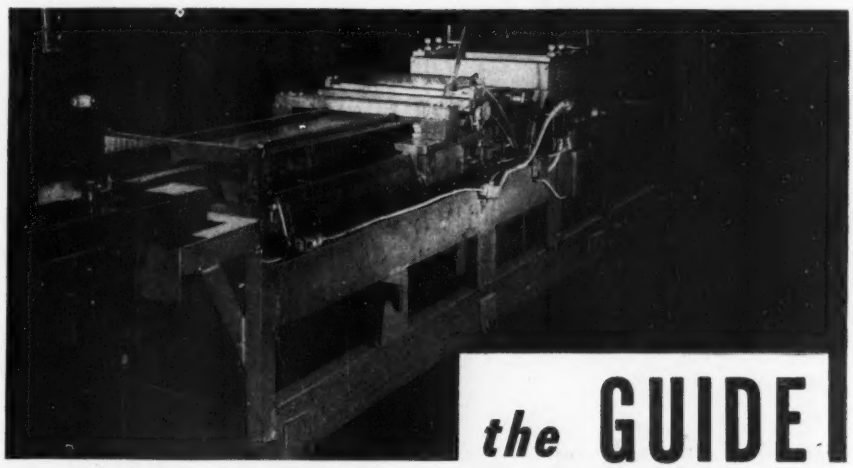

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finitely they did not expect to receive adequate quantities of steel to fill their needs and 90 per cent did not expect to receive any more sheet steel in 1948 than during 1947.

Replies were received from stampers in Connecticut, Illinois, Indiana, Massachusetts, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania and Wisconsin.

This survey, Tom J. Smith Jr., president of the institute points out, indicates the handicaps faced by the pressed metal industry. The fact, said Mr. Smith, that nine out of every ten stampers report that today they cannot obtain adequate supplies emphasizes the disproportionate increase in their requirements for steel sheet and strip as compared to the requirements for other types of steel.

U. S. Steel Reports 1947 Earnings of $126,704,272

Fourth quarter income of United States Steel Corp., New York, was $29,397,811, according to Irving S. Olds, chairman. Income for 1947, before dividends, was $126,704,272.

Shipments of steel products by the corporation's subsidiaries in fourth quarter amounted to 5,359,763 net tons—an all-time record for fourth-quarter shipments. Shipments for 1947 amounted to 20,300,430 net tons —a peacetime record. Shipments in 1946 totaled 15,181,719 net tons.

The corporation increased its ingot capacity 1,679,000 net tons last year, bringing its rating as of Jan. 1, 1948, to 31,226,200 tons.

Mr. Olds commented on the increasing cost of expansion, pointing out that upward revisions in estimates of several months ago have again been raised. He said corporation engineers now estimate a new ton of ingot capacity, with due allowances for all accompanying facilities including those for finishing, costs $300.

Production of ingots and castings averaged 100.7 per cent of rated capacity for the fourth quarter and 96.7 per cent of rated capacity for the year.

During the year $206 million was spent for additions or betterments of fixed assets. On Dec. 31 the amount necessary to complete authorized additions and improvements was approximately $350 million.

Republic Steel Corp.

Consolidated net income of Republic Steel Corp., Cleveland, for 1947, after all deductions, totaled $31,018,409, as compared with $16,033,468 in 1946. Sales totaled $649,824,006, compared with $415,749,805 in 1946.

The increase in earnings directly reflected Republic's record sales and shipments during the year and represented 4.77 per cent on the year's sales. This compares with 3.86 per cent in 1946 and 4.6 per cent in 1939.

Bethlehem Steel Co.

Net income of Bethlehem Steel Co., Bethlehem, Pa., for the quarter ended Dec. 31 was $12,377,647, compared with $11,937,281 in the like quarter of 1946 and with $10,211,336 for the previous quarter of 1947. The company's net income for the year 1947 was $51,088,375, compared with $41,731,931 in the preceding year.

Youngstown Sheet & Tube

Youngstown Sheet & Tube Co., Youngstown, reports net earnings of $26,299,923 for the year ended Dec. 31 and fourth quarter profit of $6,853,087. This compares with 1946 earnings of $14,254,905 and fourth quarter net of $5,078,510.

Lukens Steel Co.

Net sales of $52,773,066 in the fiscal year 1947 ended Nov. 1 set a new peacetime record, Lukens Steel Co., Coatesville, Pa., reports. Net income was $2,835,702, or 5.3 per cent of sales.

Luken's 1947 fiscal year comprised 14 periods of 4 weeks each, rather than 13 periods, so for comparative purposes the company's profit and loss statement and balance sheet contains figures for the 56-week period ended Nov. 1, 1947, and for the 52-week periods ended Oct. 4, 1947, and Oct. 5, 1946.

Net sales for the year ended Oct. 4 totaled $48,591,687, compared to $30,289,067 for the previous year. Net income for the 1947 year ended Oct. 4 was $2,697,117, compared to a net loss in 1946 of $480,247.

Inland Steel Co.

Net income of Inland Steel Co., Chicago, and subsidiaries for the year ended Dec. 31 was $29,888,558 of which $7,300,000 was appropriated to contingency reserves, leaving surplus of $22,588,558. Net income for 1946 was $15,556,897, with $1,012,776 appropriated to contingency reserves, leaving surplus of $14,544,121.

Keystone Steel & Wire

For the three months ended Dec. 31, second quarter of the company's fiscal year, Keystone Steel & Wire Co., Peoria, Ill., reports net profit of $1,110,058. This compares with net of

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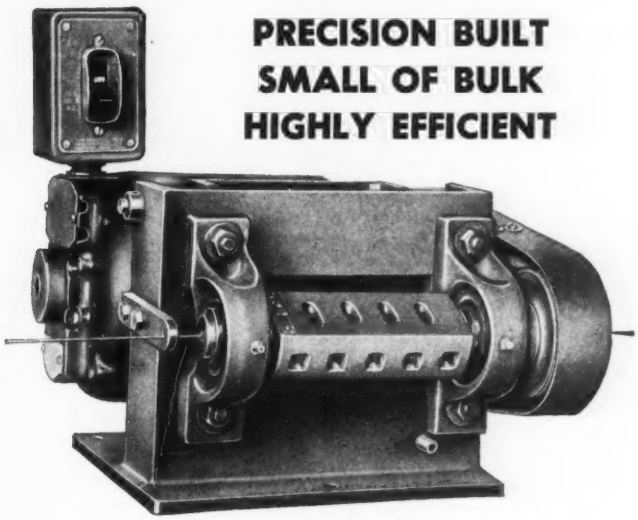

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$1,175,392 for the like quarter of 1946.

For the six months ended Dec. 31, net profit amounted to $1,926,514, compared to $2,091,535 for the same six months of the previous year.

Undistributed earnings of Keystone's two subsidiaries, National Lock Co. and Mid-States Steel & Wire Co., for the six months ended Dec. 31, not included in the net profit reported by Keystone, totaled $853,868, which compares with $735,872 in the six months ended Dec. 31, 1946.

Keystone's sales of $8,570,219 for the quarter were ahead of sales in the preceding quarter and exceeded sales in the like 1946 quarter by 28 per cent.

Allegheny Ludlum

Allegheny Ludlum Steel Corp., Pittsburgh, has announced net earnings for 1947 of $6,002,657 on sales of $106,606,288. Net earnings in 1946 were $6,599,346 on sales of $95,062,581.

Copperweld Steel Co.

Preliminary report of Copperweld Steel Co., Warren, O., places its net profit for the year ended Dec. 31 at $1,191,858, or $2.15 per common share. Net profit for 1946 was $439,777, or 69 cents per common share.

Tax Reform Held Needed To Boost Steel Capacity

Urging adoption of a federal tax program designed to encourage expansion of primary iron and steel making facilities, Harold J. Ruttenberg, vice president, Portsmouth Steel Corp., Portsmouth, O., predicts "the Marshall Plan will be stopped cold this year for lack of steel."

Writing in the February *Harper's Magazine,* Mr. Ruttenberg advocates a federal tax program with two main features:

1. The cost of all primary facilities should for tax purposes be treated the same as operating expenses, while cost of finishing facilities should continue to be treated as capital expenditures.

2. Newly built primary facilities should be subject to accelerated depreciation. A three-year amortization plan would lay the foundations for a 100-million-ingot-ton steel industry by 1949-50, compared with present theoretical capacity of 91 million ingot tons and this year's probable production of 85 million ingot tons.

Only primary facilities, which he defines as coke plants, iron ore and coal mines, blast furnaces, converters and open hearths, soaking pits and basic rolling mills such as blooming, slabbing and billet mills, would be included on the grounds that existing finishing capacity is already capable of rolling over 100 million tons of ingots a year. His accelerated depreciation program would apply only to newly built facilities because such depreciation of existing facilities might eliminate new producers.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1000 tons, power house, Northern States Power Co., Red Wing, Minn., to Bethlehem Steel Co., Bethlehem, Pa.

900 tons, plant addition, Crescent Insulated Wire & Cable Co., Trenton, N. J.; contract reinstated with Bethlehem Steel Co., Bethlehem, Pa.

340 tons, addition to Universal-Cyclops Steel Co.'s Titusville, Pa., plant, to Pittsburgh Bridge & Iron Co., Pittsburgh.

115 tons, bridge, S 0701-2, Price County, Wis., for state, to Bethlehem Steel Co., Bethlehem, Pa.; L. G. Arnold, Eau Claire, Wis., contractor.

110 tons, bridge, No. 2930, Vincennes, Ind., for State Highway Department, to Central States Bridge & Structural Co., Indianapolis; Grady Bros. Construction Co., Indianapolis, contractor.

STRUCTURAL STEEL PENDING

8000 tons, power house addition, Consolidated Edison Co., East Fourteenth St., New York, bids to be closed shortly.

7000 tons, Dravosburg, Pa., bridge; American Bridge Co., Pittsburgh, low.

3710 tons, including 2813 tons, tunnel supports, Pennsylvania state road development, Allegheny county, bids through Department of Highways, Harrisburg, Pa., Mar. 13; also 2976 tons, reinforcing steel, 272 tons of miscellaneous steel and iron, 270 tons of wire mesh and 170 tons of iron castings, for a total of 7398 tons; also 425 linear feet of 4-ft diam. caissons, and 160 linear feet of 4½-ft diam. caissons.

2000 tons, spec. 1927, Kingman, Ariz., for U. S. Bureau of Reclamation; bids taken Nov. 9 rejected.

353 tons, bridge, Sec. 18-F, Louisville, Clay County, Ill., for State Highway Department; bids Feb. 6.

330 tons, 17-story apartment, 350 East 79th St., New York, new bids asked; C. W. Harding, architect.

262 tons, bridge, Sec. FX-F, Greenup, Cumberland County, Ill., for State Highway Department; bids Feb. 6.

225 tons, transfer bridge, etc., Puyallup river, Washington, general contract awarded Manson Construction & Engineering Co. and Osberg Construction Co., joint low bidders $1,719,335 to U. S. Engineer.

150 tons, bridge, WEC-2, Douglas County, Wis., for state; W. L. Kimmes, low on general contract; bids Jan. 20.

100 tons, two-story office addition, 110 John St., bids asked.

Unstated tonnage, seven-story department store addition, Jordan-Marsh Co., Boston; bids Feb. 26.

Unstated tonnage, plant building, M. W. Kellogg Co., Jersey City; plans being issued.

Unstated; radial gates for Mud Mountain dam, Washington state; second bids in to U. S. Engineer, Seattle.

Unstated, fishway structures Mud Mountain dam; general contract to R. L. Moss, Zenith, Wash., low $194,104.

REINFORCING BARS . . .

REINFORCING BARS PLACED

310 tons, power plant and tunnels, Springfield, Ill., for state, to Bethlehem Steel Co., Bethlehem, Pa.; John Feimley Construction Co., Springfield, Ill., contractor.

300 tons, coal bins, Weirton Coal Co., Morgan-

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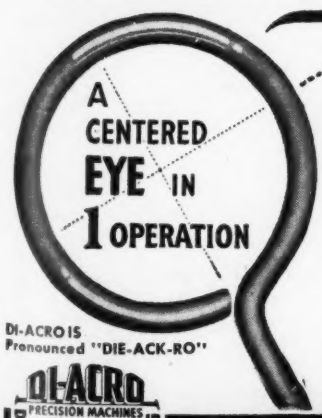

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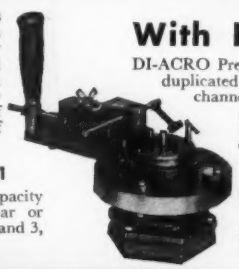

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town, W. Va., to Bethlehem Steel Co., Bethlehem, Pa.; MacDonald Engineering Co., Chicago, contractor.

200 tons, bridge, Akron, O., for state, to Bethlehem Steel Co., Bethlehem, Pa.; Bates & Rogers Construction Corp., Chicago, contractor.

155 tons, building, Dominican Sisters Convent, Dubuque, Iowa, to Olney J. Dean Steel Co., Chicago; Conlon Construction Co., Dubuque, Iowa, contractor.

130 tons, warehouse, Pittsburgh Plate Glass Co., Milwaukee, to Joseph T. Ryerson & Son Inc., Chicago; Hunzinger Construction Co., Milwaukee, contractor.

REINFORCING BARS PENDING

1500 tons, water works, Evanston, Ill., for city; bids Feb. 3.

900 tons, veterans hospital, Iron Mountain, Mich., for U. S. Veterans Administration; Gust K. Newberg Construction Co., Chicago, low bidder on general contract; bids Jan. 22.

650 tons, veterans hospital, Ft. Wayne, Ind., for U. S. Veterans Administration; Gust K. Newberg Construction Co., Chicago, low bidder on general contract; bids Jan. 23.

436 tons, 14-story apartment, Chicago; Loebl, Schlossman & Bennett, Chicago, architects; bids Jan. 26.

350 tons, apartment building, Chicago; Frank A McNally & Associates, Chicago, architects.

310 tons, auxiliary outlet sewers, Central South Side System, Princeton Ave., cont. No. 1-A, Department of Public Works, Chicago; Ranieri & Co., low on bids Dec. 29; bids rejected.

Unstated, 18-story apartment building, Chicago; Leo S. Hirschfeld, Chicago, architect; bids Feb. 4.

PIPE . . .

STEEL PIPE PLACED

Unstated, system improvements, Cle Elum, Wash.; steel pipe to Matt Malaspina, Seattle, low $80,062, award subject to completion of financial arrangements.

PLATES . . .

PLATES PLACED

100 tons or more, oil storage tank for City Light, Seattle, to Chicago Bridge & Iron Co., low $25,090.

PLATES PENDING

500 tons, pipe, spec. 2095, Wild Spur, Colo., for U. S. Bureau of Reclamation; bids to Denver Feb. 24.

100 tons, discharge pipe, spec. 2093, Pascoe, Wash., for U. S. Bureau of Reclamation; bids to Denver, Feb. 24.

RAILS, CARS . . .

RAILS PLACED

Alaska, 37,000 tons, to Carnegie-Illinois Steel Corp., Pittsburgh.

Atlantic Coast Line, 51,000 tons to the Tennessee Coal, Iron & Railroad Co., Birmingham, and the Bethlehem Steel Co., Bethlehem, Pa.

Chesapeake & Ohio, 48,964 tons, with 29,464 tons going to Carnegie-Illinois Steel Corp., Pittsburgh; 10,714 to the Inland Steel Co., Chicago; and 8786 to the Bethlehem Steel Co., Bethlehem, Pa.

LOCOMOTIVES PLACED

Nashville, Chattanooga & St. Louis, twenty-one 1500-horsepower diesel-electric locomotives, to Electro-Motive Division, General Motors Corp., LaGrange, Ill.

LOCOMOTIVES PENDING

St. Louis-San Francisco, four 4500-horsepower diesel-electric locomotives; estimated cost $1,734,720.

RAILROAD CARS PENDING

Wheeling & Lake Erie, 500 fifty-ton drop-end gondola cars, bids asked.

CONSTRUCTION AND ENTERPRISE

ALABAMA

MOBILE, ALA.—National Gypsum Co. has awarded a contract to Blaw-Knox Co., Pittsburgh, for engineering and construction of new facilities here. Contract amounts to about $500,000 and covers new equipment, improvements in processing and modernization of buildings.

CONNECTICUT

MILFORD, CONN.—U. S. Electric Motor Co., Old Gate Lane, has awarded a $200,000 contract to Kelley-Wood Co., 76 Center St., New Haven, for construction of a monitor-type factory addition.

KENTUCKY

SHREVEPORT, LA.—Triangle Pipeline Co., Dick Graves, general manager, will soon start operations on a $1 million products pipeline system. General contractor is Sheppard-Geiger Construction Co., Corpus Christi, Tex.

OKLAHOMA

DUNCAN, OKLA.—Sunray Oil Corp., Phillips Bldg., Tulsa, plans to build 60 miles of crude oil pipeline from major lines to refinery here. Cost will be $200,000. Another project includes construction of 25 miles of pipeline between Velma and Duncan, at a cost of $190,000.

RHODE ISLAND

CRANSTON, R. I.—T. A. Monahan, Wellington Ave., will build a $125,000 factory. Plans are by Oliver O. Gauvin, 72 Weybosset St., Providence.

SOUTH CAROLINA

ANDERSON, S. C. — Anderson Industrial Buildings Corp. plans to erect a $140,000 textile plant.

TENNESSEE

SHELBYVILLE, TENN.—Economaster Products Inc. will spend $100,000 rebuilding its manufacturing plant.

TEXAS

AMELIA, TEX.—Sun Oil Co., Beaumont, will build a $325,000 laboratory, shop and office here.

BAY CITY, TEX.—Bay City Gas Co. plans gas system improvements and extensions at a cost of $250,000.

BEAUMONT, TEX. — Bethlehem Steel Co. plans to spend $500,000 on a shipbuilding plant expansion.

BRENHAM, TEX.—Brenham By-Products Co., c/o L. J. Linenberger, San Angelo, will build a $70,000 rendering plant on a 100-acre site five miles from here.

DALLAS, TEX.—Dallas Power & Light Co., Dallas Power & Light Bldg., will build a $650,000 additional generating plant unit on Griffin St.

DALLAS, TEX.—Western Electric Co., 4801 Lemmon St., will build a $535,000 distributing center. Architect is H. K. C. Lawson, c/o owner.

GARLAND, TEX.—Champion Spark Plug Co., 900 Upton St., Toledo, O., will build a $1,500,000 spark plug manufacturing plant here.

GRAND PRAIRIE, TEX.—Texas Engineering & Mfg. Co. contemplates a $100,000 plant expansion.

HOUSTON, TEX.—Drumex Inc., 3940 Main St., D. B. Burns, president, will build a plant unit for renovating steel drums. Cost is estimated at $90,000.

HOUSTON, TEX.—Standard Rendering Co., Sam H. Ray, manager, 635 Adams St., Kansas City, Mo., is expanding its rendering plant here at a cost of $325,000.

HOUSTON, TEX.—Gulf Oil Corp., Eox 2100, has awarded a contract to R. E. Sullivan Co., 821 National Bank Bldg., for construction of a $165,000 laboratory.

LEVELLAND, TEX.—Stanolind Oil & Gas Co., Gulf Bldg., Houston, plans to build a $3 million natural gasoline plant.

McGREGOR, TEX.—Western Stove Co., c/o H. Honer, president, Waco, will build a $500,000 stove factory here.

PASADENA, TEX.—Crown Central Petroleum Corp., Union National Bank Bldg., Houston, will spend $250,000 on gasoline refinery improvements.

REGAN COUNTY, TEX.—Witco Hydrocarbon Corp., c/o C. E. McKinney, vice president, will build a channel black plant and a gasoline plant at a total cost of $3,500,000.

TEXAS CITY, TEX.—Petrol Terminal Corp. plans additional refinery expansion, including a distillation unit with 30,000 bbl crude topping capacity. Cost is estimated at $150,000.

UTAH

SALT LAKE CITY, UTAH—Utah Oil Refining Co., P. O. Box 898, contemplates an oil refinery expansion costing $2,500,000.

WASHINGTON

VANCOUVER, WASH.—Aluminum Co. of America, Gulf Bldg., Pittsburgh, will build a $500,000 aluminum fabrication plant here.

CANADA

EAST CALGARY, ALTA.—McColl Frontenac Ltd., Notre Dame St. E., Montreal, plans to build a $1 million oil refinery on a 60,-acre site.

HILLSBORO, N. B.—Atlantic Chemicals Co. Ltd., F. W. Pirie, president, Grand Falls, will build a $4 million plant.

HAMILTON, ONT.—Dominion Foundries & Steel Ltd., F. A. Sherman, president, Depew St., will build a blast furnace and coke oven plant at a cost of $15 million.

LEASIDE, ONT.—Standard Chemical Co. Ltd., 195 Fleet St. E., Toronto, will spend $100,-000 on plant alterations at 99 Vanderhoof Ave. Plans are by Meadows & Critoph & Co., 118 Richmond St. W., Toronto.

ST. THOMAS, ONT., CANADA — Timken Roller Bearing Co., Canton, O., will soon begin construction of a plant addition here to cost $550,000.

TORONTO, ONT.—S. A. Armstrong Ltd., 115 Dupont St., will spend $100,000 on the first unit of a plant at Yardley and O'Connor Dr. Plans are by Parrott, Tambing & Witmer, 57 Bloor St.

WHITBY, ONT.—Dunlap Tire & Rubber Co. Ltd., 870 Queen St. E., Toronto, will build a $1,500,000 plant.

WINDSOR, ONT.—Ford Motor Co. of Canada Ltd., 2780 Sandwich St. E., will build a $250,000 receiving plant.

BRYSON, QUE.—Gatineau Power Co. Ltd., 140 Wellington St., Ottawa, will install a 27,000 hp generator at its plant here to supplement a 24,000 hp unit installed at Farmers Rapids. Cost is estimated at $1 million.

GATINEAU, QUE., CANADA — Commercial Alcohols Ltd., 3176 Notre Dame St. E., Montreal, has awarded a $2,500,000 contract to Anglin-Norcross Quebec Ltd., 892 Sherbrooke S.W., Montreal, for contract work on superstructures for several plant units.

MONTREAL, QUE.—Standard Chemical Co. Ltd., 195 Fleet St. E., Toronto, will build a $2 million chlorine-caustic soda plant on Notre Dame St. Engineer is W. N. Hall, c/o owner.

QUEBEC CITY, QUE.—Kennecott Copper Corp., 120 Broadway, New York, will build a $2 million smelter plant on the north shore of the St. Lawrence river approximately 600 miles below here.

QUEBEC—Kennecott Copper Corp., 120 Broadway, New York, will construct a 30-mile railroad line from Havre St. Pierre to serve the proposed smelter plant 600 miles below Quebec City. Cost will be approximately $800,000.